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VANCOUVER WATER WORKS.

Details of Velocity and Discharge of System at Hotel Vancouver, while maintaining pressures of 85 and 80 lbs. per square inch at the Hydrant Nozzle at that point, both 12-inch Mains at Narrows being in operation, all Relief Valves closed, and no leakage occurring, as calculated by H. B. SMITH, M. Inst. C. E. June 18th, 1891.

Pressure at Hydrant, Hotel Vancouver.	Column of Water above H. W. M.	Mains full Station.	Elevation of Point of Supply above Datum.	Elevation of Point of Discharge at Hotel Vancouver, above Datum.	Total Available Head.	Total Distance, Feet.	Average Hydraulic Grade, per mile.	Column of Water above Low Water, N. Shore of Narrows.		Velocity of Water in 12 in. Mains across Narrows.	Discharge, Cubic Feet per sec. at N.	Exchange, Cubic Feet per 24 hours.	Discharge per 24 Hours, in Gallons.	
													Imperial at 6.23.	American at 7.43.
lbs. 85	Feet. 300	171	525.7	502.8	22.9	29,400	4.1127	Feet. 326	Pounds. 141	1.72	2.401	207,446	1,296,587	1,551,696
86	288	171	525.7	491.3	34.4	29,400	6.1786	326	139	2.11	2.940	245,534	1,534,588	1,836,594
80	288	172	526.5	491.3	35.2	29,500	6.3002	320	139	2.12	2.973	256,867	1,605,419	1,921,365
80	288	173	530.7	491.3	39.4	29,600	7.0281	323	140	2.25	3.141	271,382	1,636,135	2,029,937
80	288	174	532.7	491.3	41.4	29,700	7.3300	324	140	2.31	3.225	278,640	1,711,500	2,084,927
80	288	187	548.7	491.3	57.4	31,000	9.7765	331	143	2.66	3.713	320,803	2,305,019	2,599,806
80	288	195	561.7	491.3	70.4	31,800	11.6891	336	146	2.61	4.062	350,957	2,193,481	2,625,158
80	288	197	567.0	491.3	75.7	32,000	12.4905	338	146	3.07	4.286	370,310	2,314,438	2,769,918
80	288	214.21	588.7	491.3	97.4	33,721	15.2509	346	150	3.32	4.635	409,464	2,502,900	2,905,470
80	288	214.21	*607.1	491.3	115.8	33,721	18.1819	354	153	3.62	5.054	436,666	2,729,162	3,206,261
80	288	214.21	†618.6	491.3	127.3	33,721	19.9326	358	155	3.81	5.305	458,352	2,864,700	3,428,472

* With 8 lbs. pressure (= 18.4) = 588.7 + 18.

† (= 29.9) = 588.7 + 29.9.

Vancouver Water Works-Capacity Details.

The Maximum Pressure sustained by the submerged pipes is at low water.

Below that point the external pressure increases equally with the internal.

Hotel Vancouver Lbs. Pressure.	Column of Water Ft. above H.W.M.	Main full to Station.	Hydraulic Gradient Ft. per mile.	Low Water taken at 15 ft. below H. W. M. Column of Water above Inlet.	Velocity Feet per Second.	Discharge Cub. Ft. per sec.	Discharge cub. ft. per 24 hrs	No. of Gallons.	
								Imperial	American
85 lbs	300 ft.	171	4 ft.	325 ft or 141 lbs	1.31 ft.	2.056 c. ft.	177,724	1,110,775	1,329,375
80	288	171	6	318 " 138 "	1.61	2.528 "	218,418	1,365,112	1,633,760
80	283	172	7	321 " 139 "	1.74	2.732 "	236,644	1,475,275	1,765,609
80	273	173	8	323 " 140 "	1.86	2.910 "	251,480	1,571,750	1,881,400
80	263	174	9	326 " 141 "	1.96	3.078 "	265,938	1,662,112	1,989,216
80	253	187	10	328 " 142 "	2.08	3.263 "	282,290	1,764,312	2,111,529
80	243	195	12	333 " 145 "	2.27	3.564 "	307,332	1,934,650	2,300,901
80	233	196	14	338 " *147 "	2.45	3.848 "	332,466	2,077,912	2,486,845
80	223	214+21	16	343 " †149 "	2.62	4.114 "	355,442*	2,221,550	2,658,751
80	213	214+21	18	348 " †151 "	2.78	4.366 "	377,222†	2,357,637	2,821,620

* A little below Mid Tunnel.
† 16in. full all the way.
† 16in. full under pressure.

* Head from 22in. Main no pressure.
† Head from 22in. Main 8 lbs pressure.

PETER SUMMERFIELD,
Victoria, B. C.

What Constitutes a Ration.

An order issued from army headquarters lays down the rule as to what a soldier's ration shall be:

"By direction of the secretary of war, paragraph 2,150 of the regulations, is amended to read as follows:

"2,150. A ration is the established daily allowance of food for one person. For the United States army it is now composed as follows: Twelve ounces of pork or bacon or canned beef (fresh or corned) or one pound and four ounces of fresh beef, or twenty-two ounces of salt beef; eighteen ounces of soft bread or flour, or sixteen ounces of hard bread, or one pound and four ounces of corn meal. To every 100 rations fifteen pounds of beans or peas, or ten pounds of rice or hominy; ten pounds of green coffee, or eight pounds of roasted (or roasted and ground) coffee, or two pounds of tea; fifteen pounds of sugar; four quarts of vinegar; one pound and eight ounces of adamantine or star candles; four pounds of soap; four pounds of salt; four ounces of pepper, and to troops in the field, when necessary, four pounds of yeast powder to the 100 rations of flour."—Chicago Times.

WHAT THE WATERWORKS COST.

Detailed Figures in Connection With the Purchase of the System.

The transference of the plant and system of the Vancouver Waterworks Company to the City of Vancouver was completed yesterday, shortly after the hour of noon. The representatives of the city present on the occasion were: Mayor Cope and Messrs. A. St. G. Hamersley, Colonel Tracy, City Clerk McGuigan and Treasurer G. F. Baldwin.

The representatives of the company were, Sir J. W. Truch, K.C.M.G., Captain John Irving, D. M. Eberts, solicitor for the company, R. P. Rithet and J. W. McFarland, secretary.

All the necessary documents were completed, as far as the preliminaries were concerned, and the parties interested adjourned to the Bank of British Columbia at 2:45, where arrangements were completed.

The following are the figures, in detail, paid by the city for the system:

Amount of award	\$ 330,080 81
20 per cent. advance	66,016 16
Balance required to make up 10 per cent. on capital paid up, less net revenue, from operation of the works to July 31st, the date of the award	33,847 44
Interest at 10 per cent. on paid up capital from August 1st to August 5th	321 29
Interest allowed on bank overdraft	7,747 53
Interest at 10 per cent. per annum on \$330,500 paid up capital, August 6th to February 29th	\$18,833 97
Less nett receipts from operation of the works	8,828 23
Purchase price of works	\$ 10,005 74
	\$ 448,018 97

REVENUE ACCOUNT.

Due by city to waterworks to July 31st, 1891	7,015 58
One half Mr. Justice Drake's and Mr. Pilton's expenses during arbitration	27 75
One load of wood used in lowering pipes	2 00
Water used for flushing drains and sprinkling streets to July 31st, 1891	650 10

\$7,695 43

for city taxes, 1891. \$137 70
costs arbitration
aid by city 868 62 |

if jury fees paid by
city in Schmidt case. 50 00 |

1,056 32

\$6,639 11

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Vancouver News
Sept. 9th 1886

WATER FROM COQUITLAM LAKE.

Mr. A. J. McColl, Secretary of the Coquitlam Water Works Company, wrote yesterday to the Mayor and Council asking them not to negotiate with any other company until the result of the negotiations to float bonds necessary for the construction of the Coquitlam Works has been ascertained. One of the directors

H.B.S.



BILL.

An Act to amend "The Vancouver Incorporation Act, 1886," and amendments thereto.

WHEREAS a petition has been presented praying for the amendment of "The Vancouver Incorporation Act, 1886," and amendments thereto;

AND WHEREAS it is deemed expedient to grant the prayer of such Petition;

Her Majesty, by and with the advice and consent of the Legislative Assembly of British Columbia, enacts as follows:—

1. Section 49 is hereby amended by striking out the words "registered" in the second line thereof.
2. Section 112 is hereby amended by striking out the words "or not sufficiently assessed" in the first line thereof.
3. Subsection 3, of section 142, is hereby amended by inserting after the word "construction" in the second line thereof, the words "or purchase."
4. Subsection 4, of section 142, is hereby amended by inserting after the word "constructing" in the first line thereof, the words "or purchasing."
5. The following new subsection, to be known as subsection "22 a," shall be added to section 142, immediately after subsection "22."

"For encouraging manufactures within the limits of the City, by exempting from taxes and water rates, in whole or in part, for a period of one or more years, such manufactures as are now, or may hereafter be, carried on in the said City, and which, in the public interest, the Council may deem advisable to encourage."

Subsection 22a of the Act shall be known as subsection 22b.

(1886)
A CANADIAN HONOURED.

Mr. Thos. C. Keefer, C. E., C. M. G. Appointed Vice-President of the American Society of Civil Engineers.

The Ottawa Citizen of the 22nd January states that at "no stage of the existence of Confederation has the Dominion of Canada been so prominently before the eyes of the world as at the present time. Daily her sons are coming to the fore and making a name for themselves, thereby adding lustre to Britain's greatest auxiliary kingdom. It is gratifying to us to be able to announce to-day that at the meeting of the American Society of Civil Engineers for the election of officers for the ensuing year, that Society has given to Canada as high a position as was in its power in appointing as its Vice-President a Canadian engineer, Mr. Thos. C. Keefer, C. E., C. M. G., a much esteemed citizen of Ottawa. The honour is all the more worthy from the fact that the voting was by "letter ballot," by members all over the continent of America, from the Atlantic to the Pacific, and from Canada to Mexico. We are satisfied that Mr. Keefer will fill the office with marked ability, and the citizens of Ottawa may congratulate themselves on having in their midst a man of such high standing and attainments in his profession as to attract the attention of the leading engineers of this continent."

A CREDITABLE RECORD.

Mr. Keefer is well known throughout Canada as one of our most experienced and reliable Civil Engineers, not only in connection with railways and canals, but also as an eminent authority on water works and sanitation. His latest achievement in the construction of water works are those of Ottawa, pronounced to be unrivalled anywhere. Many years ago he was engineer for the Montreal, Toronto, Hamilton and London water works systems, as well as consulting engineer for many others; all of which are standing monuments of his skill and ability. His nephew, Mr. George A. Keefer, C. E., now of this city, is proposing to supply the

CITY OF VANCOUVER

with water from the Capilano creek, which empties into the first narrows, on the north side of Burrard Inlet. The water in this stream is pronounced to be excellent in every respect; the supply never failing as it comes down the mountain sides from mountains clothed in "eternal snow." For steam and culinary purposes it is specially adapted, as it is devoid of lime sediment or any substance forming scales or crustations on boilers or cooking utensils. It will necessitate

EXCELLENT ENGINEERING SKILL

to arrange for carrying pipes across the narrows, where the ebb and flow of the tide is strong. Mr. Keefer has had much correspondence with his Ottawa relation on the subject, who pronounces the scheme not only feasible but one above all other systems that the projectors of the enterprise should not fail to take advantage of. We understand that Mr. Keefer will apply to the Legislature at its present session for an act of incorporation, and that arrangements will be made at once, after its passage, to proceed with the construction of the works, in order that a supply will be available for railway and other purposes at the earliest date possible.

ANOTHER BY-LAW FALLS.

A joint meeting of committees met in the council chamber last evening to consider the propositions submitted by the two companies to supply this city with water works. After lengthy explanations by the representatives of the competing corporations as to the merits of the two schemes it was very properly decided to have the facts and figures in each case published, which will assist the city council in their deliberations and will afford our citizens an opportunity of learning the full text of the important question under consideration.

(1887)
CITY WATER WORKS.

The Capilano and Coquitlam Schemes as Pictured by the Promoters.

A reporter of the ADVERTISER has interviewed the promoters of the schemes to establish water works for Vancouver, and will, in brief, report the result of his investigations. There was a joint meeting of the standing committees of the council held last night for the purpose of hearing the propositions of the representatives of the companies, and the promoters went into a lengthy description of the relative merits of the two plans and argued the points presented in a spirited manner. The Vancouver water works company proposes to bring water from a clear water lake, Capilano, across the Narrows on the other side of the Inlet, and the Coquitlam water works company propose to lay pipes along the line of the C.P.R. from Coquitlam river, a distance of twenty-seven miles, and supply the city from that source. So far as we can learn the water in both sources of supply is pure and of excellent quality. The V.W.W. company's proposal is as follows: They ask the council to guarantee interest of three per cent. on capital invested not to exceed \$300,000 for ten years to date from the time the works are completed and in operation. Water for fire purposes will be given to the city free, if the city supplies hydrants. If the company supplies hydrants an annual charge of \$25 will be made for each hydrant. The city will have a lien on the company's receipts for the amount guaranteed. The feasibility of the plan will be guaranteed before the construction of the works are proceeded with. A continuous supply of water will be guaranteed by a double line of pipe, or by the erection on this side of the inlet of a reservoir capable of supplying 10,000 people for twenty days, which would give plenty of time for any repairs that might become necessary from accident. There is also a provision in the charter by which the city may acquire the company's interests by purchase by giving twelve month's notice.

THE COQUITLAM SCHEME.

The Coquitlam Water Works Co ask the city to guarantee interest on capital stock at 4½ per cent. on \$350,000 guaranteed to be given before the works are commenced, for a term of twenty years. Water will be furnished the city free for fire purposes, provided the city allows the company to charge a rate on insurable property. Feasibility of the works also guaranteed. This in brief constitutes the two propositions, and as near as we can tell from conversation with promoters of both companies it is the relative practicability of the works which is the point at issue, and without wishing to comment upon the investigations of competent engineers, we might simply say both companies should be prepared for accidents, which they are equally liable to, and ought to be compelled by the city's contract to protect the city against accident.

Both companies claim to be able to construct and operate their works the coming year.

(2)
It was moved by Ald. D. Oppenheimer and seconded by Ald. Lefevre that the city clerk be instructed to communicate with the agents of the two incorporated companies to supply the city with water and ask them to lay their respective plans before this council either by writing or personally on or before the meeting of this council to be held on Monday evening, the 10th inst.

WATER SUPPLY.

The next matter before the Committee were the proposals of the Capilano Creek and Coquitlam Water Companies. After a lengthy deliberation the following motion, proposed by Ald. Hamilton and seconded by Ald. Sanders, was carried:

"That this Committee having had under discussion the two schemes for water supply, feel themselves incompetent to come to a decision or pass any opinion as to their relative merits from an engineering point of view, but are a unit in regarding the financial proposals of the Vancouver Water Works Company, (Capilano Creek) as being infinitely preferable.

"And resolve with a view of ascertaining the nature of the agreement that the company would require from the city, and the powers of the corporation to enter into it recommend that the Council ask the said company to submit a draft of the same for consideration, and state whether the corporation are clothed with sufficient powers under their charter to enter therein, and if not to submit a form of bill or such amendments to the city charter in time to secure the necessary legislation at the present session of the house,

"In making these proposals it is on the understanding that an expert hydraulic engineer should be employed by the Vancouver Water Works Company, who shall within 60 days report to them as to the feasibility of constructing the works and the in intelligence of an efficient water supply at all times, but on his reporting favourably in this connection, that the agreement, if the draft meets with approval, be consummated.

"It is, however, to be distinctly understood that the execution of this agreement on the part of the corporation in no wise commits them to the correctness of the opinion of the said expert."

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(3)

(1877)

Toronto Mail March 28th 1877

Colonist April 24th

THE WATER WORKS.

BRIEFLY stated, the proposal of Mr. Mc-ALPINE and Mr. KIVAS TULLY for the increase and the purification of the Toronto water supply, is that the streams originating on the ridge which divides the Lake Ontario and Lake Simcoe watersheds should be utilized. These streams receive the rainfall of a vast stretch of country and empty it into the lake to the south of us. The idea is that the water should be caught before it reaches the large body to which it is moving, and that it should then be purified and passed into the city mains. The process of detaining it is to be effected by the construction of reservoirs at given points. A system of conduits will then convey it to the main reservoir, and thence it will be distributed to meet the requirements of the community.

The plan, which is known as the gravity system, has been tried with success at St. Catharines, and on a larger scale and with equal success at Boston, Providence and Rochester. The two leading features of it are that it secures a water supply without the expense of pumping, and that the supply is a soft and pure water instead of a hard and sometimes very dirty water. The difference in the annual cost of the two systems is thus estimated by the engineers:—Annual cost of supplying twelve million gallons of water daily by the pumping system, \$83,000; annual cost of supplying twelve million gallons daily by the gravity system, \$32,400; difference in round figures, \$50,000. The saving by the latter system, of course, arises from the circumstance that it employs no pumping machinery. In the course of a few years it is expected that Toronto will require twenty million gallons daily. If this is to be supplied under the existing system the cost will be \$161,000 per annum; if it be furnished by the gravity system the cost, it is estimated, will be about \$45,000. The only objection yet raised to the gravity system is that the water may contain the drainage of farm lands, and thus be unfit for use. This point, if well taken, would condemn the plan at once. But the experience of other

cities tells against it. The engineer of Rochester states, after ten years' experience of the system, that "the water" furnished has been abundant in quantity, "and unexceptional in quality." The only trouble which arose in that city, after the gravity plan was adopted, was during the first year of its trial, when the water, though pure, had a somewhat unpleasant taste. This, however, was remedied, strangely enough by an accident. For some unexplained reason, probably for the sake of novelty, the water, before reaching the final reservoir, was thrown into the air by means of a huge fountain. The descent from the source of supply gave the required force, and a height of from sixty to a hundred feet was reached. This process completely aerated and purified the water, and from that moment to the present time there has been no complaint regarding the quality of the supply. The Boston supply is also good, and so is that of Providence. But there should be no difficulty with the system here. It is altogether a mistake to suppose that the farmers empty their stables into the streams. They are too thoroughly alive to the value of the refuse of the stable and the barnyard for purposes of fertilization to allow it to run to waste. If, however, there were any suspicions of impurity, a system of filtration could be introduced. This, in addition to the aeration, should certainly furnish a water purer than that drawn from the lake in which is deposited the entire drainage of the city of Toronto.

It is suggested by the engineers who propose the gravity system that a thorough survey of the surrounding country should be made with a view to more thoroughly testing its applicability. Another proposal is that an aldermanic delegation should visit Rochester and St. Catharines and inspect the working of the system there. Though municipal trips are not popular with the ratepayers, this is one of a character that may repay its cost many times over within a very brief period. Both suggestions are reasonable. No further outlay upon the existing pumping system should be made until they have been acted upon.

CORPORATION OF VICTORIA.

Estimated Revenue and Necessary Expenditure for the Year 1887.

REVENUE.	
Water Rents	\$36,000
Real Estate Tax	35,000
Trades Licenses	15,000
Wholesale and Retail Liquor	14,000
Road Tax	1,600
Fire Insurance Tax, 18 Companies	5,400
Police Court—Fines and Fees	2,750
Cemetery Fees	2,000
Pound Fees	300
Weighing Machine Fees	200
Taxes outstanding	14,928
	\$147,778
EXPENDITURE.	
Interest and Sinking Fund on all Loans	\$28,402
Jury Police—	
Magistrate's salary	\$ 2,000
Superintendent do	1,500
Sergeant do	1,080
5 Constables @ \$70 per mo.	4,200
5 do do @ \$60	3,600
Clothing	900
Keep of Prisoners, Gas, &c.	1,400
Clerk of Court	480
Contingencies	800
	15,560
CHARGES, including salaries—	
Printing, Advertising, Gas, &c.	7,500
WATER WORKS—	
Salaries and maintenance	6,000
200 tons Pipes ordered	6,600
Cost of laying same	2,000
	14,600
Surveying expenses	2,000
STREET LIGHTING—	
Salaries, per month	\$310
Fuel, do	218
Carbons, September	42
Oil, &c.	14
Maintenance	50
	\$634
For 12 months	7,608
STREETS—	
Inspector's salary	\$ 1,200
Foreman do	900
Teamster do	780
Keep of horses	600
Sprinkling 3 mos.	750
	4,230
Sidewalk repairer's salary	\$ 780
Cemetery Keeper's do	900
do Secretary's do	240
Pound Keeper do	720
BOARD OF HEALTH—	
Medical officer do	720
Sanitary do	540
Park Keeper's do	540
FIRE DEPARTMENT—	
Salaries Chief	\$ 700
do Assistant	300
do Foreman Hook and Ladder and Hoseman	3,009
Salaries 2 Stewards	1,440
do 1 Driver	720
do Keep of Horses	600
New Hose and freight	1,145
Maintenance	1,000
New Hydrants	500
Contingencies, Assistance at fires, &c., &c.	1,000
Gas and fuel	600
	11,014
General Interest	1,400
Commission on Collections	400
Donations Charities	250
Legal Expenses	250
Contracts in hand	11,815
Bank of B. N. A. overdraft	4,783
Accounts unpaid	1,026
	17,624
Contingencies	4,000
Drainage verification of Surveys and trial pits	1,000
Balance available for Sundry works	27,500
ap20	\$147,778

RECEIVED
MAY 1 1887
VICTORIA CLERK

(1887)

(4)

At the present time there are two large water works schemes on foot in this province. One of these proposes to supply New Westminster and Vancouver with water taken from the mountains away up at the head of the Coquitlam River; the other proposes to supply Vancouver from a lake in the mountains on the north side of Burrard Inlet. Both these schemes involve the expenditure of some hundreds of thousands of dollars. But there is a bill before the legislature of New York which proposes to bring water to New York City and Brooklyn from the Adirondacks, a distance of 225 miles, at a cost of \$60,000,000. The water is to be brought in a canal 60 feet wide and 18 feet deep, and is to have a daily capacity of over eight hundred millions gallons!—Columbian

BURRARD INLET,

English Bay, Coal Harbor, the First and Second Narrows, and the North Arm

FULLY DESCRIBED.

A Shipping Haven Unsurpassed on the Coast.

The following interesting and detailed account of Burrard Inlet and its tributary waters is taken from "The Vancouver Island Pilot," a nautical work of great value, printed for the Hydrographic Office of the Admiralty, London, England; compiled from the surveys made by Captain G. H. Richards, R. N., in Her Majesty's ships Plumper and Hecate, between the years 1858 and 1864. As will be seen Captain Richards speaks highly of the Inlet as a haven for vessels, the anchorage and shelter being all that can be desired and making it equal to, if not ahead of, any harbor on the Pacific Coast.

(Those who are not versed in nautical terms need to be informed that "a cable's length" signifies 100 fathoms, equal to 600 feet.)

BURRARD INLET.

Burrard Inlet is the first great harbor which indents the shores of British Columbia north of the 49th parallel. Its entrance, which is between Grey Point on the South and Atkinson Point on the north, is 14 miles N.N.W. from the Sand Heads of the Fraser river, 20 miles N. by E. from Portier Pass, and 21 miles N.E. $\frac{3}{4}$ E. from Entrance Island of Nanaimo. Howe Sound immediately adjoins it on the north, Atkinson Point, the northern entrance of the Inlet, being the eastern limit of the Sound.

The entrance of the Inlet is well marked, Grey Point, a long wooded promontory, terminating in a rounded bluff, is very conspicuous from the southward, while Bowen Island, which lies at the entrance of Howe Sound, and may also be said to form the northern boundary of the Inlet, is very remarkable; its high, round and almost bare summit, Mount Gardner, reaching an elevation of 2,479 feet, is easily recognized from any point of view. Passage Island, small but prominent, lies in the eastern passage of Howe Sound, midway between Bowen Island and Atkinson Point, and is an excellent mark from the southward. Anvil Peak on with or just open westward of this Island bearing N. by W. $\frac{3}{4}$ W., clears the edge of the Sturgeon Bank.

Burrard Inlet differs from most of the great Sounds of the coast in being extremely easy of access to vessels of any size or class, and in the convenient depth of water for anchorage which may be found in almost any part of it; its close proximity to the Fraser river, with the great facilities for constructing roads

between the two places, likewise adds considerably to its importance. It is divided into three distinct harbors, viz., English Bay or the outer anchorage, Coal Harbor above the First Narrows and Port Moody at the head of the eastern end of the Inlet.

ENGLISH BAY.

English Bay is more than three miles in breadth at the Entrance between Grey and Atkinson Points, which bear from each other N.N.W. and S.S.E. and carries the same breadth for nearly its entire length or almost four miles; it is contracted in some measure, however, by the Spanish Bank, which extends in a northerly direction from Grey Point for three-quarters of a mile, and then curves easterly, joining the south shore of the Inlet at the distance of two miles within the points. This bank is composed of hard sand and is dry at low water; its edge is steep too, having off it from 20 to 7 fathoms and then on shore; when covered its existence would not be suspected. There is no ripple on it unless with strong westerly winds, and then only near low water.

This anchorage is well protected from westerly winds by the Spanish Bank, and as there is a good rise and fall of tide, as much as 16 feet at springs, and a clean shelving sandy beach at the creek mentioned, it would be a desirable place to beach a ship for repairs. The head of English Bay on the south shore terminates in a shoal arm, named False Creek; on the north shore it leads by the First Narrows to Coal Harbor. The great volume of water which discharges itself from the upper parts of the Inlet through these Narrows has scoured out a deep channel on the north side of the outer anchorage, and from 10 to 30 fathoms will be found northward of a line drawn westerly through the centre of the bay.

COAL HARBOR.

Coal Harbor is on the south side of the Inlet two miles within the First Narrows. The First Narrows lie between the bluff of Coal Peninsula and the north side of the Inlet, where the breadth of the channel is not more than $1\frac{1}{2}$ cables with a depth of 12 fathoms. A flat composed of shingle and boulder stones, covering with the early flood, extends off the north shore, so that the peninsula bluff must be kept close aboard when at the entrance of the Narrows; the mid-channel course is E. by S. $\frac{1}{4}$ S. for $1\frac{1}{4}$ miles, when the broad Inlet is again reached.

The narrow part of the channel is half a mile in length, when it gradually opens out from two cables to half a mile, which is the breadth abreast of Brockton Point, $1\frac{1}{4}$ miles within the peninsula bluff on the south shore. During the whole way the south shore should be kept aboard within two cables when past the narrowest part until abreast Brockton Point; then steer E. by S. for half a mile to avoid Burnaby Shoal, a patch marked by a red spar buoy, which lies E. $\frac{3}{4}$ S. three cables from the point, but frequently not visible until close upon it. Having cleared this shoal, haul in south for the anchorage, where eight fathoms good

\$5.

The report of the Fire, Water & Light Committee, which appeared in the News of Sunday last having been read,

Mr. G. E. Corbould asked the council to defer action in the water scheme for another week as the recommendation of the committee practically pledged the city to the proposal.

Ald. Clark favored the Capilano scheme as the Company did not ask for any guarantee until the works were completed.

Ald. Mannion thought that no better proposal could have been made and he would prefer that the report be now adopted.

Ald. Alexander said the idea of the committee was to ask the Company to prepare the agreement which would require to be signed by the city, but not to bind the corporation in any way. The payment of the guarantee was contingent on the supply being continuous.

Ald Isaac Oppenheimer advised that the report be laid over until legal advice had been obtained on the question.

Ald. Lefevre thought if there was any doubt as to the feasibility of Capilano scheme, that due consideration should be given to the proposal of the Coquitlam company.

The report was laid over for one week, it being understood that both Companies would send in their definite proposals by Monday next.

CITY COUNCIL.

An Important Report from Mr. H. P. Bell, C. E.

The regular weekly meeting of the City Council was held last evening. Present: Mayor Fell and Couns. Grant, Styles, Harris, Braden, Pearse, Vigelius, Coughlan.

THE RESERVOIR AGAIN.

The Water Works Committee presented a lengthy report on the new reservoir, along with the following report from Mr. H. P. Bell, consulting engineer.

B. W. Pearse, Esq., Chairman Water Works Committee:

SIR,—I have the honor to report progress so far. I have examined the general principle of the proposed extension of the city water works, and approve of the scheme. I find that scheme capable of further extension than the works now contemplated. I have checked the calculations in the various reports furnished me and find them practically correct. An abstract of these calculations is as follows: Summer level of Elk Lake, 189 feet over datum; level of low service reservoir, 135 feet over datum; difference of level, 54 feet; less 10 feet head for pumping purposes, 44 feet; distance for this head 31,000 feet; pipe diam. 12 in.; velocity, = 1.94 feet per second; discharge, = 151 cubic feet per second; equal to 815,400 gallons in 24 hours, or enough for 16,308 people at 50 gals. per head per day. General daily pressure on the city hall guage, 43.4 lbs; equivalent column of water, 100 feet; height of the guage, 61 feet; loss of head, 100x61-189, 28 feet; velocity, 1½ feet per second; discharge, 1,232 cubic feet per second; discharge in gallons per 24 hours equal to 665,251, or for 16,308 people, for comparison with previous calculations 41 gallons per head per day, or an increased efficiency of the reservoir over the present system of supply of 22 per cent.

If the night readings of the guage are higher than those of the day, then the percentage of increased efficiency will be in proportion more.

A new main would not serve the same purpose as the reservoir system, and the two are not capable of comparison, as the height to which the water has to be raised for the higher levels and for efficient fire protection below, is above the source of the present supply.

The site of the low level reservoir has been cross sectioned for contract purposes, and should be further cross sectioned on bed rock for contract work, as the earth is taken off. When a plan of the site of the reservoir is made with the levels attached, the outline marked thereon and other necessary plans (now making under my direction) are completed, I will see the quantities of all classes of work brought into bill form and checked.

Although not especially ordered to report on the method of excavating the low level reservoir, I will say that it should be done by the day, irrespective of cost. The site of the work is upon a declivity on one side, and any contractor for excavation might in his anxiety to do himself justice, leave the bottom and sides in such a condition that 500 barrels of cement would not stop the leaks, and the quantity of concrete required for a floor might be enormously increased to obtain the efficiency possible under careful, even if expensive work.

In reference to the site of the high level reservoir the nearer it is situated to the work to be done under a given head, the greater will be its capacity for fire purposes in case of emergency, and also for daily use. It should be remembered that a given discharge with a fixed pipe diameter can only be got upon one hydraulic gradient, and therefore the further back your reservoir is placed the more you will have to rise on a further production of the same grade.

In reference to the construction of this reservoir, it may be built of wrought iron rivetted plate, of cement masonry, or of brick in cement. For economy the first is the best, and for durability the second. The general practice of the United States engineers favors rivetted plate. If the reservoir is built of wrought iron, it should in addition to being roofed in, be walled round with timber, and an air space be left as a non-conductor of heat between the timber and iron. If built of masonry or brick work of circular form, it will become a horizontal arch suffering bending pressure under conditions the least capable of resistance that an arch of these materials can be placed in, and I would recommend that the wall be given the same strength as a straight wall under the same head of water, even if theoretical considerations required a less thickness. No other points occur to me for explanation until the plans are further advanced, but I shall be happy to give any further information that may be in my power.

Yours, &c.,

H. P. BELL.

To Save Plumbers' Bills.

"One of the most frequent and trying annoyances," said the retired plumber as he flashed his \$600 diamond ring at the reporter, "is the obstruction to the free, quick outlet of the waste water of the wash basin, the bath tub and kitchen sink. This is caused by a gradual accumulation of small bits of refuse material, paper, rags, meat, bone and grease, which check and finally entirely stop the outflow of the waste and then the plumber is called to remove the stoppage with his force pump. Sometimes this is accomplished, but often the pipe has to be cut and there is great inconvenience and expense.

"Just before retiring at night pour into the clogged pipe enough liquid soda lye to fill the 'trap,' as it is called—or the bent part of the pipe, just below the outlet. Be sure that no water runs into it until the next morning. During the night the lye will convert all the oil into soft soap, and the first current of water in the morning will wash it away and leave the pipes clean as new. See? This is practically chemistry, yet few chemists would ever think of it."—[New York Telegram.

(1917)

holding ground will be found a third of a mile from the shore.

The strength of the tide in the narrowest part of the First Narrows is from 4 to 8 knots. The only directions necessary for a steamer are to keep the south shore aboard and to be slick and careful with the helm; small craft may go through with ease, the tide being favorable; to a sailing ship a knowledge of the locality is necessary, as well as a commanding breeze.

It is high water, full and change, at Burrard Inlet at 6 p.m.; and the rise is 16 feet. The ebb stream commences directly it is high water by the shore, and runs out for two hours after it is low; there is consequently only four hours' flood stream.

NORTH ARM OF THE INLET.

The North Arm of Burrard Inlet, just before reaching Port Moody and three miles above the Second Narrows, branches off from the main Inlet and runs in a general northerly direction for eleven miles. It is entirely different in its character from other portions of the Inlet. The depth of water varies from 50 to 110 fathoms and it is enclosed on both sides by rugged mountains rising from 2,000 to 5,000 feet almost perpendicularly, and down the steep sides of which the melting snow in summer forces its way in roaring cascades, rendering the surface water in the Inlet all but fresh.

Croker Island lies between a mile of the head of the Arm and on either side of it there is a deep but narrow channel; that to the eastward is the wider. The head terminates in a delta of swamps and rushes, through which some rapid streams find their way into the Inlet from a deep and narrow gorge in a N.N.W. direction.

There is scarcely sufficient level land in this Arm to pitch a tent, nor is there any anchorage except in a narrow creek two miles within the entrance, on the eastern shore named Bedwell Bay where from 1 to 9 fathoms may be found near its head. The breadth of the North Arm at the entrance is nearly a mile, a mile within it is contracted to a little over two cables, when it shortly opens out again and maintains an average breadth of two thirds of a mile to Croker Island near the head.

During the winter fresh water is to be obtained in all parts of Burrard Inlet and probably the whole year round there would be no scarcity; in June there is abundance at the creek in English Bay, off which is the anchorage.

THE SECOND NARROWS.

Between the First and Second Narrows, a distance of $4\frac{1}{2}$ miles, the course of the Inlet is E. $\frac{1}{2}$ N. varying in breadth from a half to $1\frac{1}{2}$ miles. In the centre the depth is 36 fathoms, shoaling gradually towards either shore; but Coal Harbor, or near the South shore, offers the best anchorage.

THE SECOND NARROWS.

The Second Narrows are similar to the First; a bank of the same description, but more extensive, is caused by the deposit brought down from the high mountains by the numerous streams which empty themselves into the Inlet on the north side. This bank is dry at low water and the breadth of the deep channel, at the narrowest part and for half a mile on either side of it, varies from $1\frac{1}{2}$ to 2 cables, with a depth of from 10 to 20 fathoms. The channel, however, is straight, and the tides, which run from 3 to 7 knots, set fairly through it. The great strength of the tide ceases when half a mile from the narrowest part of either narrows.

COMPREHENSIVE & EXHAUSTIVE

A Clever and Complete Exposition of the Capilano Water Works Scheme

A Fateful Reply to Opposition Correspondence Published in the Advertiser.

To the Editor of the ADVERTISER.

Any reader of the Advertiser, who has the welfare of the city at heart, and who has taken the trouble to investigate the merits of the two proposals for water supply now before the Mayor and Council, can hardly fail to see in the letter of "One who was there," published in our issue of the 25th, the one-sided, interested motive of the writer. The sole object of his letter seems to be, not for the information of the public, but to bolster up one scheme at the expense of the other. Signing himself "One who was there," it is to be presumed he heard the discussion in the council chamber in its entirety; and yet he fails to mention one out of the very many objections to the Coquitlam waterworks scheme, while at the same time he tries to make capital out of the few doubts expressed as to the Capilano river scheme. These doubts are all confined to one point—the crossing of the Narrows of Burrard Inlet, and are of such a trifling nature that they could be entertained by none but non-professional men. They have been refuted over and over again, and it is astonishing that anyone can be found to gravely repeat them in a public journal, even under a nom de plume.

"One who was there" says that it was pointed out the instances cited by Mr. T. C. Keefer, C. M. G. had no bearing on the question, (the crossing of the Narrows.) They have a very decided bearing on the question, as they are all instances of water pipes laid successfully in deep water. They lack only salt water and a supposed rapid current to be parallel cases. Mr. Keefer expresses, in unqualified terms his professional opinion that the pipes can be safely and easily laid across the Narrows and that the whole scheme is thoroughly practicable. This opinion is certainly entitled to respect, as Mr. Keefer has devoted a life time to waterworks, and his record as a waterworks engineer stands unequalled in Canada. In the United States also, his reputation is of the highest order, as evidenced by his election, but a short time ago, to fill the chair of vice-president of the American Society of Civil Engineers.

Mr. Keefer's opinion has been endorsed in a most practical way by Mr. John F. Ward, of Jersey City, the inventor and patentee of the flexible joint pipe. This gentleman was put in possession of all facts relating to the narrows, including plans, cross sections, rates of current, nature of bottom, etc., and in return he made the company a distinct offer to lay the pipes when required for a certain sum. Mr. Ward is a civil engineer of repute, and has successfully laid his pipes

in deep and running water in very many parts of this continent and elsewhere.

"One who was there" states that it was pointed out that no instance was given of pipes laid in salt water, subject to a current of eight knots per hour, a force sufficient to move the pipe proposed, as could be demonstrated; that the current would create a friction that would scour off any coating that might be put on to protect the pipe from corrosion.

A very prominent instance of pipes laid in salt water is that of the Jersey City Waterworks Co. Mr. John F. Ward, formerly mentioned, laid 2,000 feet of pipe 38 drain, for this company several years ago. As to the durability of iron exposed to the action of salt water, it is only necessary to say that there are many instances on record where that of the best quality has suffered no deterioration in 40 years. See Trawtwine, edition 1886, page 645.

The surface current is not to be confounded with the bottom current, as was evidently done by "one who was there." He stated that eight knots per hour was to be encountered in the narrows. This is probably on the authority of the old admiralty chart of Fraser River and Burrard Inlet. The correct reading of the chart is as follows: "Tide runs out two hours after L. W. by the shore, four to eight knots." This is altogether a different thing. It means that the greatest possible velocity to be found at any time is eight knots per hour. It leaves one free to suppose that such extreme velocities are rare. However, allowing that a velocity of eight knots per hour exists. Any tyro in engineering knows that this velocity is materially decreased at the bottom. The common formula used for this calculation gives the bottom velocity at six knots per hour. However, this is a point that can be accurately determined by actual trial, and it would not be surprising if a proper trial gave a much less bottom velocity, say three to four miles per hour. As for a current, even of eight knots per hour, moving the pipes when laid, this is absurd. Each length of pipe weighs 1290 lbs. The total 1800 feet will weigh 85 tons, to be moved by the current. Now DuBout, who is an authority beyond question, states that a current of two and a quarter miles per hour will barely move a pebble the size of an egg and Smeaton, the great engineer, states that a current of eight miles per hour will not move a boulder of a half a cubic foot volume.

Besides, "One who was there" evidently has not considered the fact that this pipe will lie across the stream like a small dam, one foot high. The water will be backed up in front of it and the great force of the water will pass over the top. In course of time the sediment brought down by the current will fill up in front and gradually cover the whole line of pipe, thus forming a natural protection.

As for the friction of the water passing over the pipe destroying any coating that might be placed on them, this is such a self-evident, rash statement, unsupported

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[1887]

Rates passed Legislature for
Hawaii Water Co.

	per month
Hot House contg 5 persons.	2.00
each additional person	.25
Hotels.	
per bed	.25
" Houses.	
" bath	.50 ^c
Public Baths	1.00
Boarding Houses. each boarder	.20 ^c
Horses.	
each.	1.00
each additional	.50
Offices.	
outlet only. per tap	2. -
each additional	1. -

Per thousand gallons.

Bills up to 50 ^c per month.	1.00 per 1000
" " 10 ^c "	.45 ^c "
" " 50 ^c "	.50 ^c "

(1887)

than the surface. But in the case of a narrows, connecting a large inland basin with the sea, where the tide has a rise and fall of ten or twelve feet, the counter currents set up in this restricted passage defy calculation, and instead of being less may be actually greater at the bottom.

But, leaving out the difficulties of construction and maintenance, let us consider the second feature, the reservoir that is proposed to be built with a capacity for 20 days to secure the city with a supply of water in the event of an accident to the line of pipes. It is to be located somewhere on the Government Reserve. The highest point there is about 180 feet above the sea. The highest point of the city is about 115 feet. The difference of level is therefore about sixty-five feet. This might give force enough to supply the domestic wants of the city, but if a fire should break out during those twenty days what would be the result, with such a protection as that sixty-five feet high reservoir would afford.

The 12-inch pipe is not large enough with a full head, from the source nine miles up the Capilano, to maintain a good fire protection system, and supply 2,000 people, not to mention a 12-inch pipe with diminished pressure.

As an alternative to the reservoir a second pipe has been proposed. Of the two the pipe would be preferable, although both pipes would be subject to the same dangers, besides doubling the objections to them on the score of navigation. "Vancouver" also states that the difference in discharge between a 15-inch and a 12-inch pipe is sixty-two and a half per cent. I believe the Coquitlam Co., however, propose to lay not less than a 16-inch main from the reservoir to the city. The difference between the capacity of this and a 12-inch main is seventy-five per cent in favor of the former. The amount of water delivered by a 16-inch main, under the head proposed by the Coquitlam Co. would not only supply a city of 20,000 people, but would maintain seven hydrant streams at one time, with a constant pressure of sixty pounds per square inch. This would give a first-class fire protection. The 12-inch main, after supplying that number of people, will keep possibly two hydrants going—that is if the head is got from the source and not from the reservoir.

"Vancouver" states that increased insurance rates under the Capilano scheme is chimerical, but any reasonable man can see that the efficacy of the fire protection has a direct bearing on rates. The difference in this item alone, which would be charged under such widely different means of stopping a fire, would more than pay the guarantee on either company's shares or bonds that the council is asked to give.

These are a few of the considerations that should make men slow to adopt what has been well termed an experiment before the scheme has been pronounced upon by a competent authority.

FAIR PLAY

Vancouver, Feb. 6, 1887.

THE OTHER SIDE.

Pertinent Points Plainly Put—
Answer to Letter in Saturday's Issue.

The Waterworks' Schemes Still Further Ventilated and Discussed.

To the Editor of the ADVERTISER.

Sir—In the best interests of the city it is to be hoped that the council will not come to an hurried determination to adopt the Capilano waterworks scheme, or that the citizens generally will not accept statements, no matter by whom made, without weighing them.

A correspondent to the ADVERTISER who signs himself "Vancouver," criticising the remarks made by "One who was there," states that the instances alluded to by Mr. T. C. Keefer, C. M. G., have a very decided bearing on the problem of laying pipes across the Narrows. "And that they lack only salt water and a supposed rapid current to be parallel cases.

These appear to me to be two elements of danger, and are, no doubt those referred to, when "One who was there" stated that the cases cited do not establish a precedent for the success of the scheme. "Vancouver" seems to ignore this, and argues as if the laying of pipes in deep water is the one difficulty to be overcome. If that was all the works might be considered as good as built. It would have people to believe that cast iron is always durable for a long time in salt water.

Let him refer again to his own authority, Trautwine, and he will see it stated that common cast iron soon becomes soft, like plumbago, when exposed to sea water. The same writer also states "that destructive galvanic action takes place when two different metals are in contact under salt water." For instance lead and iron as in the case of Ward's flexible jointed pipe.

To give an idea of the stability of the pipes to resist the rush of the current, he states that each length weighs 1280 lbs., the total weight for the 1800 feet under water being 170,000 pounds. He does not state, however, that every 450 pounds of iron, (a cubic foot) submerged in sea water, loses 64 1-4 pounds, the weight of a cubic foot of it. This reduces the weight that is relied on, to stem the current by the considerable amount of 14 1-3 per cent, equal to over 24,000 pounds.

"Vancouver" is quite correct in saying that surface and bottom currents are not to be confounded, if he meant this to apply to streams such as rivers. In those cases the bottom velocity is much less

by authority that it is unnecessary to dispute it. As to danger from shipping, increased insurance rates and injury to the interests of the port, these are all chimerical. The best authorities of the province on Burrard Inlet regard the possibility of vessels dropping anchor on the line where it is proposed to lay the pipes as too remote to call for serious consideration. In regard to this the public ought to have been informed by "One who was there" that the Capilano River Co. have proposed to lay a second main across the Inlet in the comparatively still water near Brockton Point, as a safeguard against any such unlikely accident happening. If preferred, the company will build a reservoir with capacity for twenty days supply on the city side of the Inlet. The difference of discharge between a 15-inch pipe and a 12-inch pipe under the conditions stated, is true to within thirteen per cent, sixty-two and a half per cent being the excess discharge in a given time. But although this is true, the natural query will arise in the intelligent readers' mind, "what does the city want with a pipe capable of discharging so much water, when a smaller one will amply supply five times the population it is likely to have in the next five years.

An easy answer to all the objections mentioned in the letter of "One who was there," can be given by the Capilano River Co. by its undertaking to bury the pipes or cover them with concrete. This however, appears to be an unnecessary expense, and the company no doubt would be unwilling to incur it to do away with a few meaningless and unreasonable objections on the part of a rival company, laboring under the disadvantages of a route nearly three times as long as its own.

As to the impression that seem to have been circulated, to the effect that the pipes are to be suspended along the face of the canon of the Capilano. I have full authority to state it is entirely erroneous, and that in no case from the source of supply to the central point of distribution in the city, except where submerged under the Inlet, will the pipes be less than three feet below the surface.

VANCOUVER.

January 28, 1887.

What the People Talk About

The waterworks schemes and the vast difference between the two propositions from a financial standpoint in favor of the Capilano company.

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Victoria Rates.		per mo.
Lowest rate.	per house	1.00
	bath	.50
	Horse.	.50
Hotels.	room	.25
Saloons (bar only)		1.00
Shops & offices.		.50
Factories	per M.	.60

(1887)

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COQUITLAM VS. CAPILANO

The Former Scheme Denounced as Being too Expensive.

To the Editor of the News.

SIR.—As one much interested in the future of Vancouver, I have watched with care the proceedings of the Council relating to the two proposals for water supply now before them. I have also read the letters that have been published from time to time on the subject and have been much surprised to find that a financial point of the utmost importance to Vancouver has been entirely overlooked. The ratepayers of Vancouver are well aware that the Capilano River project is solely in the interests of the city of Vancouver, whereas that of the Coquitlam Waterworks Company embraces the old-established and fairly wealthy city of New Westminster as well as Vancouver. New Westminster, through her position on the Fraser River and her wells, is to a certain extent independent of any other supply but is not unwilling to accept one, provided that another city can be found to pay for it. The source of such a supply for New Westminster is undoubtedly a point on the Coquitlam River, but being some 20 odd miles from it the cost of such a work is more than that city cares to pay. The Coquitlam Waterworks Company, by adding an additional 10 miles or so to these 20, can accommodate Vancouver as well.

It is, therefore, a very important point for the ratepayers of the young city of Vancouver to consider what just proportion of any guarantee asked for by this company, they should be called upon to give. The proposition which the Company make to the Council is that Vancouver should guarantee 4 per cent on a totally unknown sum, viz., the bonds issued by the company. Their proposition at first sight reads as if the guarantee were asked for on an estimated cost of \$350,000; but this is not the case. They ask for this guarantee on whatever bonds they may choose to issue. But, supposing \$350,000 is meant, what is asked for from the city of New Westminster, which is to have equal water privileges with the city of Vancouver? So far as I have seen, no proposal has yet been publicly made to its Council and adopted. It is said that the city will guarantee a percentage on \$100,000 or \$150,000. If it does, Vancouver will have to guarantee at least \$200,000 more to enjoy the same privileges.

To me this seems an outrage on the common sense of the people of Vancouver, and every ratepayer should see to it that no such detrimental proposition be accepted.

OBSERVER.

Vancouver, Feb. 16.

At half past nine o'clock the Mayor temporarily vacated the chair which was occupied by Ald. Alexander until shortly before the close of the sitting. The two water schemes at once came on for deliberation, Mr. G. E. Corbould, of New Westminster, representing the Coquitlam Water Company, and Messrs. Koefer and J. W. McFarland being present on behalf of the Capilano Company.

Mr. Corbould, being called upon, asked for a further postponement of the question until Mr. Hill, the representative of the company, now on his way from England, was present. Mr. Corbould promised that his company would give as favorable terms to the corporation as the Capilano company. Mr. Wilmut, president of the company, had had the misfortune to break his leg in Victoria last week and this had prevented him from being present to-night. The application to amend the guaranty powers of the charter could proceed notwithstanding the postponement.

After a short discussion, on motion the matter was again postponed for a fortnight.

CITY COUNCIL.

The City Council held its usual weekly sitting last night in the City Hall, all the members of the board being present.

The secretary of the Vancouver Water Works Company wrote asking that leave be given to withdraw the proposition made by them until the council was ready to consider the two schemes finally. On motion the communication was ordered filed and the request complied with.

San Francisco rates 1882.

Left.	1 Storey.	2 Storeys	3 Storeys	4 Storeys
500 to 700	1.25	1.25	1.50	1.70
700 . 800	1.25	1.50	1.70	1.85
800 . 900	1.50	1.70	1.85	2. -
900 . 1000	1.70	1.85	2. -	2.20

No single rate less than \$1.35

Bath Tubs private houses.	each tub	.67
Public Houses	each tub	1.50
Horses.	one.	.67
	each additional	.33
Cows.	one.	.42
	each additional	.20
Boarding houses	each boarder. up to 10.	.17
	each additional	.12
Water Closets	public buildings	1.35
	Private	.30
Buildings.		
	Ea. brick	.
	Ea. M. Bricks.	.
Bakeries.		
	Ea. 25 Bbls Flour.	1.

A Reply to "Fair Play."

To the Editor of the News.

SIR.—"Fair Play's" letter, which appeared in the Advertiser of the 7th inst., although headed "Pertinent Points Plainly Put," and claiming to be an answer to "Vancouver's" letter in the same journal, shows its weakness in every line. If the two letters are placed side by side and carefully considered, it cannot fail to strike the reader that "Fair Play" has carefully ignored many important points in "Vancouver's" letter and, therefore, tacitly admits his inability to dispute them; while, on the other hand, he endeavors like his predecessor, "One Who Was There," to bring into prominence the worn-out statements made by interested parties and which no one can claim have been endorsed by any water works authority. It is this point in particular that the people of Vancouver have to consider. All the statements and trifling objections to the crossing of the Narrows which have been so persistently forced on the attention of the public, are entirely without the support of any recognized authority on water works. This is a simple truth, and if not, it remains only for "Fair Play," "One Who Was There," or the gentlemen who raised the objections in the Council chamber to name the authority.

On the other hand, the crossing of the Narrows as proposed by the Capilano River Co., has been emphatically endorsed in all its details by the recognized highest authority on water supply in Canada and the United States. This fact can not be disputed, and until the opponents of the Inlet crossing produce a better authority on their side, their objections must be considered valueless.

"Fair Play" endeavors to throw a doubt on "Vancouver's" statement that cast iron of the best kind has existed undeteriorated under salt water for 40 years. "Vancouver" repeats this statement and again refers the reader to Trantwine, Edition 1886, pages 218 and 645. It is here stated that common (that is, inferior) cast iron becomes soft under the action of salt water, but that good, hard, white or light gray castings have been known to exist for forty years uninjured.

"Fair Play" states, on the authority of Trantwine, that lead and iron in contact as in the case of Ward's flexible joined pipe, will create a destructive galvanic action. This is untrue, Trantwine particularly mentions brass and copper in contact with iron as inducing injurious galvanic action but nowhere can there be found a reference to any other metal producing a similar effect.

The calculation that "Fair Play" makes to show that the weight of pipe relied on to stem the current in the Narrows is incomplete and therefore incorrect. He does not take into account the extras connected with a submerged pipe, nor the great resistance to movement that the friction between the pipe and the gravel bed of the Inlet will cause.

"Vancouver" did not mean to confine his statement as to the difference between surface and bottom currents to rivers and streams. He certainly intended it to apply to the Narrows of Burrard Inlet as well. "Fair Play" surely does not mean that he wishes the people of Vancouver to understand that he believes it is possible for a free and unrestricted current

on the surface to be less than a current struggling along a vast friction surface like the bed of Burrard Inlet. If he does believe this it is very unfortunate for his other arguments. However, as stated before, the exact velocity of this bottom current in the Narrows can only be determined by actual trial. At present all probabilities are in favor of its being a moderate speed. But, moderate or not, it has no bearing on the subject, notwithstanding all assertions to the contrary, as, if necessary, the pipes can be anchored, covered over or buried. This alone should be quite sufficient to put an end to all discussion.

With regard to the city reservoir the writer is not aware that the Capilano River Company are bound to build it in any one particular spot. Should the elevation of the head of the Government Reserve be deemed insufficient, there are several points within two miles radius of the water front at Cordova Street which proper levels would show to be amply high enough.

Fair play states "that a 12 in." pipe is not large enough, with a full head, from the source 9 miles up the Capilano, to maintain a good fire protection system, and supply two thousand people. This statement is simply absurd, and can have only one object—to temporarily mislead the public. The source is not 9 miles up the Capilano, but $6\frac{1}{2}$ miles. It is 9 miles from the source to the distributing point on Carrol St.

The Capilano River Co. have explained their project to the Council and all Engineers in the fullest manner. Large and small scale detailed plans, profiles etc. the results of actual surveys, and facts as to cost etc. have been openly displayed. They propose to build a reservoir at their point of supply at the Capilano. A main 18 in. diameter, capable of discharging three million two hundred thousand gallons in 24 hours will be laid for three miles to a point 400 feet above high water, and distant $3\frac{1}{4}$ miles from the Narrows. A 12 in. main will connect at this point and be laid as far as Carrol street, where its discharge will be two million seven hundred thousand gallons in 24 hours assuming an allowance of 60 gallons per day to each inhabitant, this will supply a city of 22,500 people. If water were used only during a day of 12 hours, it would amply supply a population of forty five thousand people. It is unlikely that Vancouver will have such a population for some years, and if it had, how absurd to suppose that the full supply for every man woman and child in the place, would be in demand for domestic purposes on the occasion of an outbreak of fire. Fair play appears to be unaware that it is customary in all well regulated cities to shut off the supply to individuals, when a fire of sufficient magnitude occurs to warrant such a proceeding. There can be no reason why the city of Vancouver should not do so likewise.

In regard to a second pipe across the Inlet in lieu of a reservoir on the city side, "Fair Play" prefers the pipe, but asserts that it would be subject to the same dangers as the one near the Narrows. As enough has been said and written to show that these dangers are imaginary nothing further need be said on the subject, unless to state that the second pipe, crossing near Brockton Point, would rest in comparatively smooth water and would to a certainty be covered up with the black mud so plentifully seen along the shores in that neighborhood.

In regard to insurance rates, "Fair Play," as well as "One Who Was

There," merely makes an improbable assertion, conceived entirely in their own imaginations. Such a system of water as the Capilano River Co. propose to build, endorsed by competent authority, as it undoubtedly is, will never be questioned by insurance companies.

The conclusion of "Fair Play's" letter, appealing to the public to be careful to come to a decision before the scheme has been pronounced on by a competent authority, is amusing. He seems to have entirely forgotten that the highest professional authority in the land has, as already stated, declared the Capilano River Company's scheme perfectly practicable. Its construction is ready to be undertaken by practical men. All its promoters are reputable men and believe in its superiority over all other schemes to such an extent that they are prepared to invest their own money in it.

And now that so much has been said and written about the Capilano River Company's scheme would it not be in the interests of the public for the Coquitlam Waterworks Company to make known some of the details of the lengthy and costly system of water supply they propose to furnish the city with? So far as "Vancouver" knows, no one has yet seen their survey plans and profiles, and it is a matter of considerable doubt as to whether they possess such necessary adjuncts to a full understanding of their proposal. Without proper surveys it is impossible for them to furnish even an approximate estimate of the cost of their works or the remotest idea as to its practicability. Anyone can understand that this is a simple truth. In their own interests it would be advisable for them to lay them before the Council. This body as yet has but a very imperfect idea of their proposal. They understand in a general way that the company propose to bring water from a lake on Coquitlam River, over a rough and unknown distance, to a point near the head of Burrard Inlet. Here a reservoir will be built at an elevation indefinitely stated as about 350 feet above sea level. Thence by a 16 inch main, will be carried over the road-bed of the C. P. R. to Vancouver. The whole length is claimed to be 21 miles but unless this can be shown as having been actually measured any maps the reader may scale over will lead him to conclude that the distance is 27 or 28 miles.

This information is absolutely all that is publicly known of a proposal which so vitally concerns every inhabitant of Vancouver, and which the City Council is asked to endorse in such a substantial manner as a guarantee of 4 per cent on the Company's bonds, and a rate to be derived on insurable property up to $\frac{1}{4}$ of 1 per cent. The sum total of these bonds is not mentioned. They may amount to the stated estimated cost of \$350,000, or to a million dollars. No one knows. Any one who takes the trouble may easily calculate what $\frac{1}{4}$ of 1 per cent on two or three million dollars worth of insurable property will amount to. This, it is to be noted, is their last proposition. As they have already made several, each one a little better for the city, it may be that they may still make another and yet another. What a state of weakness this betrays.

Columns might be written on this subject, but this communication has already extended further than was intended.

VANCOUVER.

Iacoma Water Rates

No rate less than 1.00 per month.

Bakeries.	1.50 to 4.00
Bath Tubs private	.50
public.	1.00
Barber shops. mechair.	1.50
Each additional	.25
Blacksmith Shop. 1 Fire	1.00
Each addl	.25
Butcher shops.	1.50 to 3. -
Building per sq. ft. brick	12 1/2
br. limes.	12 1/2
Cement.	12 1/2
pierch stone.	10.
Hotels + Bdg. Houses per room 2.	20.
Laundries.	3.00 to 10.00
Offices.	1. -
Saloons.	1.50 to 3.00
Stables one horse.	.50
each additional.	.25
Stables livery. up to 6 horses per horse.	40
each addl over 6.	.25
Stores.	1.50 to 3.00
Urinals.	.25 1/4
W.C. public houses each bowl.	.50.
private houses.	.30.
By Meter. 1 M to 50 M.	75¢ per M.
over 50 M.	50 ¢ "

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THE COUNCIL'S DUTY

On the Proposals of the Two Water Companies.

To the Editor of the News.

SIR.—Owing to the conflicting statements which have been made by the advocates of the respective companies that have charters to bring water into Vancouver, it is very difficult for the general public to arrive at any intelligent conclusion on the subject.

It is, however, unquestionably the duty of our Council to satisfy itself beyond a doubt by obtaining the professional opinion of some reliable authority as to the points at issue and the merits of the schemes generally, before assuming the responsibility of committing itself. So far as I understand the controversy, the principal point at issue is the practicability of laying pipes on the surface of the bottom of the Narrows as proposed by the Capilano Company. According to the assertion made in a communication signed "Vancouver" which appeared in the Advertiser of the 5th inst., the pipe when so laid would not, in all likelihood, be liable to danger from any source, and would be of sufficient weight to prevent its being moved by a current of even 8 knots an hour. On the other hand, the writer of the letter published in your issue of the 17th inst., signed "One Who Was There," quoted authorities for data, and submitted the result of calculations which show that a current of six miles an hour would not only carry away the pipe as proposed to be laid, but would also carry it away were it more than three times as heavy.

If that representation is any way near being correct—and until it is contradicted by more reliable authority than that submitted we can only take it for granted that it is correct—it would be indiscreet, to say the least, for the Council to commit itself to such an undertaking without enquiry. What the city urgently requires is to be furnished with an abundant supply of water from a thoroughly reliable source in the shortest possible time. The city is not in a position to await the result of experiments which, if they should not prove successful, would postpone indefinitely the benefits to be derived from a water supply—benefits that would far more than compensate the city for the assumption of a reasonable guarantee, even if it had to be paid.

What excuse would it be for those who have the management of the city's interests in charge to say that "the company asked only for a small guarantee, or even for no guarantee at all," if in the event of the undertaking proving unsuccessful they should have to start in anew and obtain water elsewhere.

In a matter of such vital importance to the city and one entailing an expenditure of over a quarter of a million of dollars it would be in the best interests of the community for the Council to obtain reliable information from an independent source, and then to adopt that system which would best serve the interests of the city.

CITIZEN.

Vancouver, Feb'y. 15.

THE CAPILANO SCHEME.

An Answer to "Citizen" and "One Who Was There."

To the Editor of the News.

SIR.—"Vancouver" was of the opinion that the glaring miscalculation of "One who was there" as to the result produced by a bottom current acting on water pipes laid across Burrard Inlet, which appeared in your issue of the 18th ult., would be so self-evident to the people of Vancouver that a reply would be unnecessary. Since, however, "Citizen," whose letter appears in the News of the 20th ult., seems inclined to place some faith in the conclusion arrived at, "Vancouver" will endeavor to show that his conclusion is not only incorrect but absurdly so, and, although none are so blind as those who will not see, he trusts to be able to make this so apparent that no further information on the subject will be needed.

Inasmuch as the bed of the Inlet is not rock, (as admitted and even proved by "One who was there"), but much mixed with small stones and gravel, the pipes when laid will be in close contact with the bottom; that is, they will embed themselves by their own weight from $\frac{1}{4}$ to $\frac{1}{2}$ their depth—perhaps more. The truth of this statement can be verified by anyone who may take the trouble to walk along the shores. The bottom of the pipe being closely protected by the mud with which it is in direct contact, can receive no pressure from the superincumbent water. The upper surface and sides alone will be exposed to the effect of this pressure. Therefore, anyone with average intellect will readily understand that the pipes will be acted upon by only three pressures, viz., a downward pressure and a horizontal pressure on each side. There can be no upward pressure as in the case of all bodies simply suspended in water. An illustration of this simple hydrostatic fact may be found in "Fanning, or Water Supply," page 180. Moreover, it is a fact well known to the average school boy that a piece of wood or any other light body, if placed under the same circumstances as these waterpipes, will not rise to the surface but remain fast at the bottom, being firmly held there by the water above it. Should this be doubted, let the reader refer to any standard work on hydrostatics, or to "Trantwine," Edition 1886, page 236, Article 19. "One who was there" has betrayed his entire ignorance of these simple truths and in his calculations has fallen into the gross blunder of considering the pipes as being in a state of suspension, and not in such close contact with the bottom as to be really a part of it. The result has been that he has offered to the public a calculation which is entirely erroneous, and shows a want on his part of any practical knowledge on the subject.

The true theoretical resistance to motion, when the pipes have been laid, may be determined as follows: The upper surface of the pipe receives from the superincumbent water a vertical downward pressure equal to the area pressed multiplied by the depth of water. There being no under surface exposed, there can be no counteracting upward pressure. For a similar reason the pipe suffers no diminution in weight. Assuming the coefficient of friction adopted by "One who was there," viz., 0.33, to be correct, as also his effect of a supposed 6-mile current, viz., 99 lbs. per foot run of pipe (this latter, let it be clearly understood, is the only part of his calculations authorized by Rankine and Duchemin's formula, the resistance of pipe to motion being entirely his own calculation), the entire stability of pipe in the deepest sounding recorded, viz., 66 feet at low water, is thus shown: Weight of superincumbent water on each square foot is equal to area pressed, 1 sq. foot, multiplied by depth, 66 feet, and by the weight of a cubic foot of salt water, 64.14 lbs. This gives a direct downward

"FAIR PLAY'S" REJOINDER.

To the Editor of the News.

SIR—"Vancouver" in his letter of the 2nd inst., quotes from "Fair Play's" letter the statement that a 12-inch pipe with a full head from its source nine miles up the Capilano would not maintain a good fire service and supply 2000 people. That is what was actually printed in the Advertiser of the 7th inst. by mistake for 20,000. I called the Editor's attention to the misprint, and he said he would correct it in his next issue, but that paper has been suspended ever since. He told me however, that he had explained that it was a typographical error to the Capilano people. I am, therefore, a little surprised that "Vancouver" should make the assertion that it was done intentionally to mislead the public.

The other statements in that letter have not been at all weakened, I think, by his clever serial.—YORRIS, etc.,

"FAIR PLAY."

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VANCOUVER WATER WORKS COMPANY.

— O:O —

VANCOUVER, B. C., 14th March, 1887.

Sir,—

On behalf of the Vancouver Water Works Company I respectfully beg to submit for the consideration of the members of the City Council the annexed proposition of our Company to construct and maintain a system of Water Works for the City of Vancouver.

I am, Sir, your obedient servant,

J. W. McFARLAND,

Secretary-Treasurer V. W. W. Co.

THOS. F. MCGUIGAN, ESQ., City Clerk, Vancouver.

PROPOSITION.

1st. The Vancouver Water Works Company will construct a complete system of Water Works for the supply of the City of Vancouver with pure water from Capilano Creek, such water to be taken from the creek at an elevation of 430 feet above extreme high tide.

2nd. They will lay a duplicate line of 12 inch pipes across the First Narrows.

3rd. They will furnish water for fire purposes in the City free of charge, and will place hydrants in the City at any point along their line of pipes for the use of the City at a rental of \$25.00 a year for each hydrant, or, in the alternative, will supply and place in position hydrants for fire purposes only, at a cost of \$100.00 each to the City.

4th. They will furnish to the City the opinion of a competent Hydraulic Engineer as to the feasibility of their scheme.

5th. They will have a sufficient supply of water for all purposes for the City within 18 months after the agreement hereinafter referred to has been entered into.

6th. They will agree to sell the said Water Works to the City at any time for a fair valuation to be settled by arbitration (according to the arbitration clause in their Act of incorporation) together with 20 per cent added to the sum that may be arrived at by the arbitrators or umpire, and in addition paying to the Company an amount which, together with the annual dividends of the Company, will be equal to 10 per cent per annum on the amount invested from the commencement of expenditure on the works to the date of transfer to the City.

7th. They will agree that all monies (if any) that may be paid by the City on the guarantee hereinafter mentioned shall be a debt due by the Company to the City, and shall be repaid to the City from the receipts of water rates, when such shall have increased sufficiently to admit of such payment being made, and for such purpose the Company will give to the City a lien on such water rates. In consideration of such undertaking by the Company, the City of Vancouver shall enter into an agreement with the Company, that so soon as the works are completed and in successful operation, to guarantee to the stock or debenture holders in the said Company three (3) per cent per annum on the cost of construction of said works, such guarantee to extend over a period of ten (10) years from the date of completion of the said works, and shall not be on a greater sum than two hundred and seventy-five thousand (\$275,000) dollars, and shall always be subject to the proviso that the works shall be kept in efficient operation.

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pressure of 4,283 lbs. The weight of one foot of pipe is 107 lbs., which also acts downwards. The total pressure on the bottom of the Inlet is, therefore, 4,340 lbs. As resistance to motion is entirely due to friction, by multiplying this 4,340 lbs. into 0.33, the co-efficient of friction, the result is found to be 1,432 lbs. per foot run, or in other words, the pipe will not move unless the current acting on it exert a force greater than 1,432 lbs. per foot run. But, "One who was there" has demonstrated, on the authority of Rankine and Duchemin, that the current exerts a force of only 99 lbs. per foot run. Hence the pipe will remain where it is placed entirely undisturbed by the current. This calculation is not guess work, but a simple hydrostatic fact, which can readily be verified by a reference to any standard authority on hydrostatics, and which can be worked out by anyone possessing ordinary education.

And now to come to the next most prominent feature in the letter of "One who was there." He explains that only one-half of the distance from the point of supply on Coquitlam River, 12 miles, [sic] is to be included in the Vancouver system, and that, therefore, the two proposals stand relatively thus—Coquitlam scheme, 15½ miles long; Capilano, 9 miles long. Will this gentleman kindly explain, why, if this is the case, the Coquitlam Company are endeavoring to obtain a guarantee on \$350,000 from the city of Vancouver, while they intend to ask only \$150,000 from the city of New Westminster, which is to have a system 12½ miles long? In other words, the city of Vancouver is asked to guarantee \$22,530 per mile, while New Westminster will be asked some time in the near future to guarantee only \$12,000 per mile, both cities to enjoy exactly the same water privileges, no matter which becomes the larger in the future. Besides, let it be remembered that the first proposition this Company made to the Council of Vancouver was to grant them a guarantee of six per cent on \$500,000, or \$32,253 per mile. It is, therefore, self-evident that the Company include more than 15½ miles in their estimate of the length of the Vancouver system, or they calmly prepare to make Vancouver pay for a system of water supply for the city of New Westminster. If this latter is the case, it is more than probable such a piece of unparalleled effrontery will not meet with the approval of the ratepayers of Vancouver.

"One who was there" in his first letter, made the gentleman who spoke in the Council Chamber confound surface and bottom currents. Now, he, in a vain effort to better matters, becomes completely mixed up on mean velocities. He quotes the conclusion come to by Mr. Elliott, C.E. in regard to mean current in certain parts of the Mississippi River. Had he honestly continued his quotation he would have added that the very next item in the same authority, "Trantwine," page 268, says: "In streams of nearly uniform slopes and cross section, there is a great reduction of velocity near the bottom. As a very rough approximation, the deepest measurable velocity in streams of uniform slope, etc., appears to

be from ½ to ¾ of the mean velocity." To give this extract did not suit the purposes of "One who was there." It is this muzzling of truths and partial extracts which give rise to the conflicting statements complained of by "Citizen." The ill-considered attempt to make the people of Vancouver doubt the practicability of the Inlet crossing, can rely on only such means for success.

The information given to Mr. Ward as to the rate of current in the Narrows was that marked on the Admiralty Chart, viz., surface velocity 2 hours after low water from 4 to 8 knots per hour. This is precisely the same information that "One who was there" is in possession of, and on which he bases his erroneous calculations and arguments, and which, for this purpose, it suits him to consider all-sufficient.

The self-confidence with which he thinks for Mr. Ward, a gentleman whom, in all probability, he never saw and did not know existed until the other day, is incomprehensible. Mr. Ward is too practical to put himself in a false position and when he agreed to lay these pipes on the information furnished, he knew quite well what he was about. He is not likely to be surprised when he sees the Inlet, but he will be more than surprised if he ever sees this last letter of "One who was there."

"Citizen" is anxious to have better authority than that already submitted as to the practicability of the Inlet crossing. Surely this is not wilful ignorance on his part, although it looks like it. An altogether independent and at the same time, the highest opinion in the Dominion, has long been secured and submitted to the Council. This opinion, which emphatically endorses the Capilano scheme in all its details, was given as "Citizen" must surely know, by Mr. T. C. Keefer, C.M.G., President (proposed) of the Canadian Society of Civil Engineers, and Vice-President of the American Society. Can "Citizen" suggest a higher or a better authority than this? Hardly.

The crossing is not an experiment in any sense of the word. It is only one of the common undertakings that occur now and again in engineering practice. It can hardly be said that to build such structures as the Victoria, the Brooklyn and the Niagara bridges, the Thames tunnel, the Mont Cenis tunnel and like works, were experiments. Yet such works were all built and are all in existence to the present day, and the only guarantee of their practicability was reliable professional opinions.—Yours truly,

VANCOUVER.

February 23, 1887.

WATER WORKS SCHEME.

To the Editor of the News.

SIR,—"Vancouver's" letter published in your issue of the 22nd inst., states that he has not as yet seen his survey plans, and proper of the Coquitlam Water Works Co., and doubts "as to whether they possess such necessary adjuncts to a full understanding of their proposal." Vancouver will be interested to know that an instrumental survey has been made over the proposed route, and the distance and levels accurately obtained; and what he is pleased to represent as a rough and unknown country, has been found to be a remarkably favorable and easy route, and one that will compare most favorably with the known and extremely rough country through which the route of the Capilano Co. passes.

If a comparison of the actual cost of the two systems were made, it would be found that the cost of furnishing water from the Capilano to Vancouver would be as great, if not greater than from the Coquitlam.

When we take into consideration the fact that half of the expense of the works from the Coquitlam Lake to the reservoir on Burrard Inlet, will be included in the New Westminster system, leaving for the Vancouver system a length of route of 15½ miles, through a very favorable country, and half the cost of a reservoir. Whereas for the Capilano scheme there is a length of nine miles from the head works to the point of distribution, an unknown number of miles from the point of distribution to the reservoir, on the city side; the cost of building two reservoirs, and the unknown and enormous expense of laying the pipe across the Narrows. As the valley of the Capilano Creek is, in places, a rough and rocky canyon, which, according to Vancouver's statement, rises 400 feet in 3¼ miles, it will be understood that the cost of construction and delivery of material per mile of such a route will greatly exceed that of a route where, for a greater part of the distance, the material can be delivered by train at the spot where it is required. Another very important natural advantage in favor of the Coquitlam scheme is that it derives its supply from a large and practically inexhaustible lake, which forms a natural reservoir.

In the Capilano scheme a reservoir of limited capacity is substituted for the lake, and which, in an unusually dry season, when the demand for the city would be liable to be greater than the supply furnished by the stream would become exhausted and the city left with an insufficient supply.

It is amusing to see Vancouver taxing the Coquitlam Co. with want of minuteness in stating that their reservoir will be about 350 feet above sea level, when after it has been shown that the Government Reserve is not sufficiently high for the purpose required, he states there are several points within two miles radius of the waterfront of Cordova street which proper levels would show to be amply sufficient. As an amply sufficient head for fire protection would require to be at least 230 feet above sea level, it is not at all probable that that elevation can be obtained within two, or even three miles of the place named. Whatever the distance may be, it will add to the estimated cost of the works.

In "Vancouver" letter published in your issue of March 3rd he endeavors to demonstrate that the pipe will when laid across the Inlet, bury itself to about half its depth, and hereby be subject only to a downward pressure from the water.

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THE COQUITLAM WATER WORKS COMPANY.

—O:O—

VANCOUVER, March 14th, 1887.

His Worship the Mayor and members of the Council of the City of Vancouver.

GENTLEMEN—

On behalf of the Coquitlam Water Works Company, I beg to enclose herewith a proposition for supplying the City of Vancouver with water.

I have the honor to be, gentlemen, your obedient servant,

E. A. WILMOT.

The Coquitlam Water Works Company make the following proposition ;—

That they will construct and maintain a thoroughly efficient system of Water Works for the supply of the city of Vancouver from the Coquitlam ; the work to be completed within one year after the proposed agreement with the Corporation becomes operative. The Corporation is asked to guarantee 3 per cent. interest per annum on the Company's bonds to an amount not exceeding \$280,000 for 20 years. The amount guaranteed will be lessened each year by a sinking fund which will make the total guarantee about equal to a guarantee on the same amount for 10 years without a sinking fund. The Company ask for no guarantee until the works are completed to meet all the requirements of the City.

The Company will furnish water for the purposes of protection against fire free of charge. The main, from the source to the Reservoir near Port Moody, will be 14 inches in diameter, or of sufficient capacity to supply 25,000 people with 60 gallons a day per head, and from the Reservoir to Vancouver not less than 16 inches in diameter, the latter distance being 9 miles. The elevation of the Reservoir will not be less than 350 feet above sea level.

The Reservoir will have sufficient capacity to supply 25,000 people with 60 gallons a day per head for ten days. The works will afford a first-class fire protection and will be capable of maintaining a pressure equal to 60 lbs. per square inch at the highest part of the City, while responding to a fire draught of ten hose streams throwing 15,000 gallons a minute.

The City to have a lien on all receipts up to the amount of its liability for interest ; and any amount advanced by the City for deficiency under the guarantee will be repaid by the Company.

If within two years there are 5,000 inhabitants in Vancouver the revenue from water rates estimated on the basis of \$4.50 per head per annum, will be \$22,500, on which the City will have security for its liability on account of its guarantee of \$8,400.

Further, in consideration of the Council guaranteeing interest on the bonds of the Company as above specified, the Company will be willing to make over to the Corporation of Vancouver an interest equal to one-eighth of the total net profits received from that portion of the works embraced in the Vancouver system.

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He erroneously states that the result of the calculations submitted by "one who was there" regarding the effect of the current on the pipe applied only to the case of a pipe in suspension.

It was applied to the case of a pipe resting on the bottom, with a weight of 86.29 lb per running foot; and it was demonstrated that a side pressure of 28.47 lb per foot would be sufficient to move it, and that the pipe would be subject to a lateral pressure, from a six mile current; equal to 99 lb per foot. In a former letter Vancouver stated that the pipe would lie across the stream like a small dam one foot high. Now that it has been demonstrated by unquestionable authority, that if so exposed, to a six mile current, it certainly would be carried away; he tries to make out that the pipe will embed itself, so that it will be subject only to a downward pressure.

In other words he states, in effect, in his letter of February 5th that the pipe will lie like a dam one foot high and collect sediment.

In his last letter he gives it to be understood that the pipe will embed itself to about half its depth. As neither the law of gravitation nor the nature of the bed of the Inlet have changed since February 5th, we can only infer that "Vancouver" has changed his representations to meet the circumstances of his case.

In order to demonstrate the correctness of "Vancouver's" last assumption, it will be necessary to prove that a pipe such as that proposed to be used will, with a pressure on the bottom of 86.29 lbs. per foot, embed itself to about half of its depth in the bottom of the channel, which, he says, is much mixed with stones and gravel, and further, that when it is so embedded it will form a contact with the adjoining material that will be absolutely watertight. With regard to the last condition, if we refer to one of the authorities quoted by "Vancouver," viz., Trantwine, Edition 1886, page 236, it will be seen that the author states that "if one side of a block of light wood, perfectly flat and smooth, be placed upon the similarly flat and smooth bottom of a vessel, and held there until the vessel is filled with water, the downward pressure will keep it in its place until water insinuates itself beneath, through the pores of the wood. But if the wood be smoothly varnished to exclude water from its pores it will remain at the bottom." The whole weight of the above testimony goes to show that unless the material with which the body is in contact is impervious to water the water does not exercise a downward pressure only. Now, nobody but "Vancouver" would for one moment imagine that material much mixed with stones and gravel would be perfectly watertight.

But, unfortunately for his absurd contention, unless stone and gravel are in cement or other material that would be too compact to allow of the pipe embedding itself into it of its own weight, water would be sure to percolate and the pressure would be equal in all directions.

Yours truly,
ONE WHO WAS THERE.

March 5th, 1887.

THE WATER SCHEMES.

Below we give the propositions from the two water works companies, one of which it is expected, will be adopted by the City Council next Monday night.

VANCOUVER WATER WORKS COMPANY'S PROPOSITION.

1st. The Vancouver Water Works Company will construct a complete system of Water Works for the supply of the City of Vancouver with pure water from Capilano Creek, such water to be taken from the creek at an elevation of 430 feet above extreme high tide.

2nd. They will lay a duplicate line of 12 inch pipe across the First Narrows.

3rd. They will furnish water for fire purposes in the City free of charge, and will place hydrants in the City at any point along their line of pipes for the use of the City at a rental of \$25.00 a year for each hydrant, or, in the alternative, will supply and place in position hydrants for fire purposes only, at a cost of \$100.00 each to the City.

4th. They will furnish to the City the opinion of a competent Hydraulic Engineer as to the feasibility of their scheme.

5. They will have a sufficient supply of water for all purposes for the City within 18 months after the agreement hereinafter referred to has been entered into.

6th. They will agree to sell the said Water Works to the City at any time for a fair valuation to be settled by arbitration [according to the arbitration clause in their Act of Incorporation] together with 20 per cent added to the sum that may be arrived at by the arbitrators or umpire, and in addition paying to the Company, an amount which, together with the annual dividends of the Company, will be equal to 10 per cent per annum on the amount invested from the commencement of expenditure on the works to the date of transfer to the City.

7th. They will agree that all monies [if any] that may be paid by the City on the guarantee hereinafter mentioned shall be a debt due by the Company to the City, and shall be repaid to the City from the receipts of water rates, when such shall have increased sufficiently to admit of such payment being made, and for such purpose the Company will give to the City a lien on such water rates. In consideration of such undertaking by the Company, the City of Vancouver shall enter into an agreement with the Company, that so soon as the works are completed and in successful operation to guarantee to the stock or debenture holders in the said Company 3 per cent per annum on the cost of construction of said works, such guarantee to extend over a period of ten years from the date of

completion of said works, and shall not be on a greater sum than two hundred and seventy-five [\$275,000] dollars, and shall always be subject to the proviso that the works shall be kept in efficient operation.

THE COQUITLAM WATER WORKS COMPANY'S PROPOSITION.

They will construct and maintain a thoroughly efficient system of Water Works for the supply of the City of Vancouver from the Coquitlam, the work to be completed within one year after the proposed agreement with the Corporation becomes operative. The Corporation is asked to guarantee 3 per cent interest per annum on the Company's bonds to an amount not exceeding \$280,000 for 20 years. The amount guaranteed will be lessened each year by a sinking fund which will make the total guarantee about equal to a guarantee on the same amount for ten years without a sinking fund. The Company ask for no guarantee until the works are completed to meet all the requirements of the City.

The Company will furnish water for the purposes of protection against fire free of charge. The main, from the source to the reservoir near Port Moody, will be 14 inches in diameter, or of sufficient capacity to supply 25,000 people with 60 gallons a day per head, and from the reservoir to Vancouver not less than 16 inches in diameter, the latter distance being 9 miles. The elevation of the reservoir will not be less than 350 feet above sea level.

The reservoir will have sufficient capacity to supply 25,000 people with 60 gallons a day per head for ten days. The works will afford a first-class fire protection and will be capable of maintaining a pressure equal to 60 lbs. per square inch at the highest part of the City, while responding to a fire draught of ten hose streams throwing 1,500 gallons a minute.

The City to have a lien on all receipts up to the amount of its liability for interest; and any amount advanced by the City for deficiency under the guarantee will be repaid by the Company.

If within two years there are 5,000 inhabitants in Vancouver the revenue from water rates estimated on the basis of \$4.50 per head per annum, will be \$22,500, on which the City will have security for its liability on account of its guarantee of \$8,400.

Further, in consideration of the Council guaranteeing interest on the bonds of the Company as above specified, the Company will be willing to make over to the Corporation of Vancouver an interest equal to one-eighth of the total net profits received from that portion of the works embraced in the Vancouver system.

[COPY OF LETTER FROM T. C. KEEFER, Esq., C. M. G., MEMBER INSTITUTE CIVIL ENGINEERS, AND VICE-PRESIDENT AMERICAN SOCIETY CIVIL ENGINEERS,
RE, PROPOSED VANCOUVER WATER SUPPLY.]

OTTAWA, January 21st, 1886.

G. A. KEEFER, Esq., C. E.,
Victoria, B. C.:

I have received the survey for the proposed Water Supply of Vancouver from the River Capilano, on the opposite side of Burrard Inlet.

The scheme embraces all the elements of success—assuming that the quality of the water furnished by this river is unexceptionable.

* It is a gravitation supply with unlimited pressure, practically, and (if the quantity measured as the present discharge is available at all seasons), it may be said to be unlimited as to supply, as this quantity would supply a city of over half a million population. If only a fraction of this quantity were available at the driest seasons, it would be sufficient for years to come and could be increased, if necessary to any extent upon such a river by storage reservoirs.

One great advantage of the commanding head afforded by this river is that the utmost desirable pressure can be obtained for protection from fire, dispensing entirely with all other appliances for this purpose. Another important advantage from this increasing elevation of the river is the economy of construction which it affords. The lowest point of supply for present needs can first be adopted and the delivery of the pipe increased and its pressure maintained by extending its mouth or inlet higher up the river, or by raising the head by means of a dam, or both. Lastly, the abundant pressure admits of the use of small pipes, which are not only so much cheaper, but stronger proportionately.

There is no difficulty whatever about bringing the water across the First Narrows of Burrard Inlet. I have had pipes which were laid more than ten years ago across the Rideau and branches of the Ottawa Rivers, and have since been under constant pressure of nearly 100 lbs., equal to over 200 feet head of water, and there has been no failure. A pipe three feet in diameter is laid across Toronto Harbor. The islands in New York Harbor are supplied with fresh water by pipes under pressure from the mainland.

If the temperature of the salt water at the First Narrows does not go down as low as 32 deg. F., no protection against frost will be necessary, as is the case in New York Harbor, where the pipes are boxed in.

In any case, the extra cost of the pipe at the crossing of the First Narrows will be but a few thousand dollars over the cost of the same length of pipe, under the most favorable circumstances, on land.

Unless, therefore, you can get the same Quality, Quantity and Elevation of water within the same distance of Vancouver on the south side of Burrard Inlet, there can be no question that the River Capilano should be selected as your source of supply.

THOS. C. KEEFER.

* The discharge of our source of supply, Capilano Creek, may safely be taken at its lowest stage as 350,000 gallons per minute—at the time of gauging (5th December), when the water in the Creek was at about its average for nine months in the year it gave over double this quantity.

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To the Mayor and City Council of Vancouver, B.C.

Gentlemen:

The question before your honorable body is one of all-absorbing interest and of most vital importance to our young city, and the subject is one which deserves both in its financial and objective features (i. e.; the supplying of the city with pure water and an ample protection against fire), to receive the closest scrutiny. A scrutiny which should not only extend over the present but should be far-reaching and comprehend the situation of the city in its financial position ten years hence.

There are two schemes before your honorable body for Water-works systems for Vancouver. I shall try, in as short a manner as possible, to place before you some of the advantages of the financial proposition of the promoters of the Vancouver Water-works Company's scheme, and that proposed by the promoters of the Coquitlam scheme.

By their offer of the 14th March inst., the promoters of the Vancouver Water-works propose to supply the inhabitants of Vancouver with pure water from Capilano Creek.

They offer to have the works finished *within* eighteen months. They offer to sell the works after construction to the City on certain terms. They offer hydrants at \$25.00 a year each. They offer the City water for fire purposes, free from cost, and in return they ask the City to become their security to the extent of 3 per cent on the *actual cost only* of the works, and which security will only be binding on the City for ten years after the completion of the works, and subject further to the very important stipulation that the works are kept in efficient operation.

Virtually, to bring the matter down to a fine point, the Vancouver Water-works promoters say to the City: You become security to our stockholders for 3 per cent on the actual cost of our works, such security to date from completion of the works and extend over a period of ten years, and in turn will give you a first class water supply.

It is beyond all argument that as a financial scheme that of the promoters of the Vancouver Water-works Company is beyond all doubt the most promising, as the utmost distance of construction and of laying of pipes to say, the intersection of Carrall and Hastings streets, is not more than nine miles, while that of the Coquitlam Company under similar conditions as to construction have not less than twenty-one and a half miles of piping from their source of supply to the same point, and we are informed that besides the twenty-one and a half miles of piping, their water supply has to be conducted through six or more miles of open ditching.

It hardly needs to be argued that the former scheme, (V. W. W.) has this very strong element in its favor, that it will cost barely one-third of the cost of the Coquitlam, be equally effective, in fact the water is taken from a higher elevation, cannot be surpassed for purity and the volume passing down Capilano Creek is not less than 300,000 gallons a minute during the lowest stages of water, as ascertained by actual admeasurement.

The only argument that can be urged (if any argument at all) against the effectiveness of the Vancouver scheme is that the pipes must traverse the First Narrows; the question is one quite (we humbly submit) beyond those not having a practical knowledge of hydraulic engineering.

Can anyone, after reading the opinions of such an hydraulic engineer as Mr. Thos. C. Keefer is held to be in America, whose professional attainments in this particular branch of engineering have placed him in the prominent position of Vice-President of the Society of American Civil engineers, doubt that the scheme is a feasible one? No, no one can doubt it, and the best argument is the fact that Mr. Keefer's opinion as to the safety of crossing the Narrows was placed before many people in Vancouver early last year, and was in the possession of Civil Engineers who are promoters of the Coquitlam Company, and no one of repute has dared to refute the opinions, and we throw out a bold challenge to the promoters of the rival scheme to produce an opinion of competent authority to gainsay one word or one single dictum Mr. Keefer has boldly published to this community.

Good, fair, honest rivalry is much to be admired, but the usual stock arguments of certain professional gentlemen who are closely allied to the rival scheme, should not have much weight with your honorable body, if the authority of men who have made hydraulic engineering a life-long study is one of any weight.

But apart from the opinion of Mr. Keefer we have produced the opinion of Mr. Jno. F. Ward, a renowned American hydraulic engineer, (who has made a specialty of laying pipes under both fresh and salt water) whose opinion coincides with that of Mr. Keefer. A perusal of that opinion could not help convincing the most skeptical person that the dangers of the Narrows as to the laying of the pipes are simply *nil*, and it is to be trusted that the bug-bear, "the dangers of the Narrows" introduced into the community to the prejudice of our scheme will be dispelled, and the propositions of the two Companies in a business point of view be for the consideration of the Council.

We may here say that the promoters of the Vancouver Water-works are now ready and have always been ready to lay before a competent person a detailed estimate of the probable cost of their

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works, with surveys etc., and at the same time will place before the same authority a fair statement of the conditions of the Narrows, if the rival Company will place their whole scheme in detail before the same authority, and will run their chance upon the decision of the Engineer to whom both schemes will be referred, as to which Company shall receive the approbation of your honorable body. We fear no rivals in fair war; all we ask and desire is that the whole question as to the true merits of the two Companies will be decided in a fair manner after a thorough investigation has been made into each system.

The utmost cost of the Vancouver scheme will be \$240,000.00.

If the facts as set out in the offer of the Coquitlam Works are true, the income to the Vancouver Company in two years would be \$22,500. which would be in the neighborhood of 9½ per cent. But the promoters of the Vancouver Company have no such sanguine expectations as that each person in the city two years hence will contribute \$4.50 per head per annum. They have based their calculations on \$3.00 per head per annum, which would, if the city had a population of 5,000 people give them an income of \$15,000.00 per year. Taking their issue of bonds at the outside to be \$240,000.00, and let them draw 5 per cent, the annual interest would only amount to \$12,000.00, giving a balance in favor of the promoters of \$3,000.00 of income over interest.

In speaking generally, your honorable body cannot fail to remember that when the Coquitlam scheme was first before you, the promoters asked from the City a guarantee of 6 per cent on \$500,000.00 an amount equal to more than the present revenue of the City, and we think quite a sensible proposition from the promoters of the Coquitlam scheme, when you consider the magnitude of their works and the amount of piping.

We are informed from undoubted authority that an independent water scheme for Vancouver from the Coquitlam, without the reservoir at Port Moody, cannot cost less than \$450,000.00.

Now taking such a scheme and placing it in its most favorable light, allow the Company a revenue of \$22,500.00 (which in our humble opinion is far in excess of what it will be) you have an income of \$22,500.00 as above and an expenditure of \$22,500.00 a year in interest, taking the bonds at 5 per cent. At a reasonable estimate the iron in the Coquitlam scheme will cost not a cent less than \$375,000.00.

As we said before an independent scheme to Vancouver will cost no less than \$450,000.00, and if a reservoir be built at Port Moody and New Westminster be included, the scheme will cost not less than \$650,000.00, on which the Company will have to pay 5 per cent interest, so that an income of \$32,500.00 will have to be derived from some source.

The above estimates include a distributing system of four miles of piping and fifty hydrants common to both Companies. In the case of New Westminster a similar allowance is made.

If our figures are right it does not seem beyond the bounds of possibility that the City will be called upon yearly for the guarantee, which at 3 per cent on \$280,000.00 amounts to \$8,400.00 a year, or \$168,000.00 in twenty years, or more than sufficient to pay for the iron used in the construction of the Vancouver system.

\$168,000

We cannot help, at this juncture calling your attention to the fact, that the promoters of the Vancouver Water-works have always been consistent in their offer to the City, while that of the rival Company seems to have been framed to meet the offer of the Vancouver Company, not in a fair, square business way, but solely to meet the approbation of the City.

They now offer to construct the works within one year from signing of agreement, an engagement beyond the bounds of possibility, when you consider that the piping is not in stock, that all measurements have to be sent to England, (and it is no small matter to float a \$500,000.00 debenture in the English markets) order your piping; transfer 4000 tons of pipes, and lay some twenty-five or thirty miles in one year.

If the Coquitlam promoters can finish their scheme in twelve months, by parity of reasoning the Vancouver promoters could finish theirs in eight months.

In the offer of the Coquitlam Company they anticipate the building of a reservoir at Port Moody. This contemplates the building of a line to New Westminster to whom no doubt they will also apply for help, but it may not be out of place to say that we doubt the power of New Westminster to grant aid by way of guarantee. By bonus they may, but any bonus they might give would be but a small proportion of the guarantee of twenty years as asked for by them.

Though not of great importance perhaps, we may mention that the base of operations of the Vancouver Company will be in Vancouver and will afford an opportunity for a certain number of workmen, and what money is spent will be indirectly in the interest of the City.

We again reiterate that we are willing that both schemes should be placed before a competent disinterested engineer, and if he thinks our scheme is not by far the most advantageous to Vancouver we will retire from the contest with the knowledge that we have had every consideration in a matter deserving of so much thought and solicitude for the welfare of our young Vancouver in which we are nearly all directly interested. Yours truly,

VANCOUVER WATER WORKS CO.

By J. W. McFarland, Secretary.

Coquitlam Water Works Co'y

Mr. E. A. Wilmot, representing the Coquitlam Water Works Company, explained:

The cost of work to bring water to Vancouver, including a distribution system for, say 5,000 people, is estimated at \$350,000. The city is asked to guarantee 4 per cent interest on the company's bonds; the interest on the first year, while the work is under construction, to be paid by the Company. The works to be completed in one year from time of issue of guarantee, the Company being willing to give a bond or a forfeit that this should be done. The City to have a lien on all receipts up to the extent of its liability for interest; and any amount advanced by the City for deficiency under the guarantee, is to be charged against the Company and repaid by them, the City to be secured by a lien on the revenue.

If within two years there are five thousand inhabitants in Vancouver the revenue from water rates, estimated on the basis of \$4.50 per annum, will be \$22,500, on which the City will have a security for its liability on account of its guarantee of \$14,000. The guarantee not to extend beyond twenty years and the liability on guarantee will be lessened each year by sinking fund.

The Company will furnish hydrants, wherever the Council think necessary, free to the Corporation, and maintain a first-class fire protection, whereby insurance will be reduced to a minimum rate not exceeding say 1½ per cent, provided that a fire protection rate is levied on property thus protected, sufficient to cover the expenses necessary to furnish such fire protection.

The rate to be levied on insurable property not to exceed ¼ of 1 per cent.

The Company will furnish water free for flushing sewers when necessary, or for other public use that will not interfere with the revenue of the Company to the extent of 300,000 gallons.

The main, from the source to the reservoir near Port Moody, will be 14 inches in diameter, or of sufficient capacity to supply 25,000 people with 60 gallons a day per head, and from the reservoir to Vancouver, not less than 16 inches in diameter, the latter distance being about 9½ miles.

The elevation of the reservoir about 350 feet above sea level.

The reservoir will have sufficient capacity to supply 25,000 people for ten days.

The Company will guarantee the feasibility of the scheme, and an opinion thereon from a disinterested engineer will be submitted.

The Vancouver

Water Works

The Vancouver Water Works make the following proposition:

That they will construct a complete system of water works for the supply of the City of Vancouver from Capilano Creek on the north side of the Inlet for a sum not exceeding \$300,000. The water to be conveyed under the waters of the narrows to the south shore by a 12 inch main, and as a safeguard against accident they will, as may be determined by the Council, either lay a duplicate pipe at some distance from the other or provide a reservoir on the south side capable of containing a supply of water for a population of 10,000 for twenty days. The distance from the source to the city is nine miles and the difference in elevation 430 feet.

That they will furnish water for the purposes of protection against fire, free of charge, the necessary hydrants to be provided by the City, or the Company will furnish the hydrants at a rental of \$25 per annum.

They further agree to furnish to the Council the opinion of a competent and independent engineer as to the feasibility of their scheme, and that the work shall be completed, if possible, within a year from the conclusion of the proposed agreement with the Council, and not later than eighteen months. To better enable the Company to prosecute the work they ask that the Corporation of Vancouver shall enter into an agreement that when the works are completed and in successful operation the Corporation will guarantee to the stockholders 3 per cent per annum on the cost of construction for ten years, subject to the proviso that the works shall be kept in efficient operation. Should the Corporation be called upon to pay the whole or any portion of the interest so guaranteed, such sums shall, as they are advanced, be charged to the account of the Company as loans, and repaid to the Corporation from the receipts for water rates, when such shall have increased sufficiently to admit of such payment being made, and for such purpose and to such extent the Corporation shall have a lien on the rates.

The Corporation shall have the power to purchase the entire works at a fair valuation to be settled by arbitration, with 20 % added and paying to the Company an amount, which, together with the annual dividends of the Company shall be equal to 10 % per annum on the amount invested from the date of commencement of operations to the date of transfer to the Corporation.

CITY COUNCIL.

The City Council met last evening at the usual hour, His Worship the Mayor in the chair and all the members being present.

On the consideration of the two water schemes the City Clerk read a lengthy communication from the Vancouver Water Works Company under date of March 21, commenting on the proposal of the Coquitlam Water Works Company and offering to permit their scheme to be submitted to a practical engineer for consideration.

Mr. E. A. Wilmot, representing the Coquitlam Company, replied to the statement in the circular of the rival company and said that he was ready to submit to the Council the figures and estimates on which their scheme had been based. The total cost of the works would not exceed \$280,000.

The Aldermen conferred with each other for over an hour and a half, and eventually on the Mayor asking for an expression of opinion from the members of the Board,

Ald. Humphries arose and said everyone seemed to be afraid to say anything. [Loud applause.] He declared himself as being in favor of the Capilano scheme. [Cheers.]

Ald. Sanders remarked that he would support the Coquitlam scheme. [Applause.]

Another pause of ten minutes' duration here occurred.

Ald. Alexander said that so far as the engineering part of the proposals were concerned he thought that their feasibility should be left to practical men. He considered it imperative that the Council should secure the opinion of practical engineers on the question of crossing the Narrows and also the cost of the two schemes. The Coquitlam Company had changed their original proposals materially both as regards cost and rate of interest. He would support the scheme of the Vancouver Water Works Company. [Cheers.] He considered it advantageous that this city should have a scheme of its own independent of any other (renewed cheers) rather than ally itself with New Westminster, which he had heard it stated had not the power to guarantee the interest on the bonds. Ald. Alexander minutely criticised the Coquitlam scheme and pointed out what he considered the weak points of the proposal, and thought it would be dangerous for Vancouver to go into partnership with New Westminster when they had no information that the latter city would give its assent to the guarantee. There were many points which he would like the Coquitlam Company to explain before coming to a final decision. The city was about to float a loan for \$150,000 at 6 per cent and he did not see how either of the companies could float their loans at 3 per cent on the same guarantee. There was no provision for the purchase of the Coquitlam scheme, which he considered a drawback. The Capilano Co. were ready to sell their works at any time the city was ready to take them. He closed by saying that he felt he must support the Capilano Company's proposition. [Cheers.]

Mr. G. E. Corbould, on behalf of the Coquitlam Company, replied to Ald. Alexander's remarks.

Alderman Lockerby proposed, and it was seconded by Ald. Isaac Oppenheimer: "That the proposal of the Coquitlam Water Works Company be adopted as best suited for Water supply for the City of Vancouver."

Replying to Ald. Mannion, Mr. G. A. Keefer said that the amount spent in labor on the Capilano scheme would be fully \$100,000.

Ald. Mannion said that as the city would receive the benefit of the whole of that expenditure, he would support the Capilano scheme (loud cheers.)

Ald. Lefevre said there was a certain amount of doubt as regards the Capilano scheme and he thought that the opinion of an expert should be taken. From a financial point of view the schemes were alike. He felt bound, therefore, to support the Coquitlam Company. (Applause.)

Ald. Clark had considered both schemes and thought that the opinion of an expert should be taken. He moved the following amendment, which was seconded by Ald. Alexander: "That, in the opinion of this Council it is desirable to submit both schemes of water supply to a competent engineer or engineers for his or their opinion upon the merits and cost of either scheme; the engineer or engineers to be agreeable to both companies. And further, that both schemes, with the report of the engineer or engineers be submitted to a board of insurance companies, with all the necessary data and plans for their opinion of the merits of either scheme. And the difference in premiums, if any, that the companies would be prepared to take insurance risks in the city under either system of water supply."

Ald. Hamilton favored the Coquitlam scheme, but would support the amendment of Ald. Clark.

Ald. Lefevre favored the matter being decided at once and thought it unnecessary to secure the opinion of an engineer on the Coquitlam scheme, which he considered perfectly feasible while there was a doubt about the rival proposal.

Ald. Clark, while considering the Coquitlam scheme the safer of the two, thought the amendment should be carried.

Ald. Mannion urged that there was no need for any further delay.

Ald. Lockerby supported the Coquitlam scheme.

Ald. Clark's amendment was defeated, the vote being four ayes and six noes. Ald. Lockerby's motion received a tie vote, the figures being five ayes and five noes. On being put a second time the motion was carried, six voting aye and four nay.

The following are the Aldermen who voted in favor of the Coquitlam scheme: Ald. David Oppenheimer, Isaac Oppenheimer, Lockerby, Sanders, Hamilton and Lefevre.

Those who supported the amendment referring the two schemes to a practical engineer were: Ald. Alexander, Mannion, Clark and Humphries.

The Council, which had been sitting uninterrupted for four hours and a half, adjourned at midnight.

THE TWO WATER SCHEMES.

After full and careful investigations into the two water schemes which have been before the City Council for the past few months, the Coquitlam scheme appeared to that body as the most practicable and advantageous and was therefore adopted. This action has led to considerable discussion among our citizens and a great many express their surprise that either of the schemes should be adopted without the opinion of an outside and capable engineers report. It is evident, however, that of the two, the Coquitlam scheme appears at once the most practicable and feasible and the fact that there are no seeming barriers or speculation as to its successful operation speaks largely in its favor. What Vancouver wants is a water works system that they can depend upon in any emergency and one that can be represented to the different insurance companies as always to be depended upon. There is considerable speculation as to the practicability of a main pipe stretched across the narrows always being depended upon and in case of fire when an extra pressure of water will be required, should a break occur it would place the city at the mercy of the flames and the results might prove most disastrous. The Coquitlam scheme certainly appears to be free, in its present prospective, from any possibility of a break or flaw occurring that could not be repaired in a very short space of time. The matter however, will come before our citizens in a short time and we trust that an intelligent and unbiased opinion will be the result. The columns of the News are open for discussion on the two schemes.

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Ald. Lefevre will introduce a by-law at the next sitting of the Council to provide for the assent of the property-owners to the contract to be entered into between the municipality and the Coquitlam Water Works Company, which guarantees and annual interest of 3 per cent on \$250,000 for a period of twenty years.

WATER WORKS SCHEME.

To the Editor of the News.

Sir,—The ratepayers of this city have great need to look well into the respective merits of the different schemes presented to them for approval in reference to the water supply of this city and in arriving at a satisfactory conclusion in this respect the future equally with the present needs their careful consideration and looking at the rival schemes from this standpoint alone the offer of the Vancouver and Capilano Co. is by far the most preferable, the three per cent guarantee being only asked for ten years whereas the guarantee of three per cent asked by the Coquitlam Co. is asked for twenty years and it is only fair to presume that the guarantee asked by the Coquitlam Company in excess of that asked by the Vancouver Company.

Another important question that every ratepayer should ponder over well before voting aid to the Coquitlam Co. is, how is this company going to construct a water source 22 miles in length from its source to this city for only \$5000 in excess of the amount required for a $9\frac{1}{2}$ mile service by the Vancouver Co. Some may say that is none of our business, it is for the Company to find out how it is to be done but, fellow ratepayers if this Company should hereafter find out that their estimates on construction were too low this city would be placed in a serious position and would undoubtedly be forced to extend further aid to the company or go without water for a year or two more and it is just possible some such contingency is calculated on by the Coquitlam Co.

Another matter for consideration is that of the power and right of this city to purchase the works being omitted in the Coquitlam proposal, this should certainly be remedied and our Council should insist on the right of purchase being inserted in all cases of this character to which the city may become a party.

As to the element of doubt as to the feasibility of the crossing of the Narrows with safety with the pipes of the Vancouver or Capilano Co. I with many of our citizens think that if our Council had availed themselves of the Vancouver Co.'s proposal to furnish competent engineers' opinion on that point that the doubt would long ere this have been removed and we now should have had under construction what two-thirds of the resident ratepayers of this city wish viz.—The Vancouver Water Co. works, and this Co. being composed of our own citizens whose interests are identical with ours would have made this city their base of operation and supply this in an indirect manner recouping us for the small guarantee asked by them or their bonds.

Yours respectfully,

JUSTICE.

THE VOTE ON THE WATER SCHEMES.

In our report of the voting on the Coquitlam water scheme the names of "ayes" and "nays" were incorrectly printed. The following is the correct vote on the motion: "That the proposal of the Coquitlam Water Works Co. be adopted as best suited for water supply for the city of Vancouver."

Ayes—Clark, Lefevre, Lockerby, I. Oppenheimer, D. Oppenheimer and Sanders.

Nays—Alexander, Hamilton, Humphries and Mannion.

COQUITLAM LAKE.

To the Editor of the News.

Sir,—It is a wellknown fact to all who have a knowledge of Coquitlam Lake that in the spring salmon go up the Coquitlam River to spawn and enter the lake in thousands and die there. Is this the place to draw water from for a city? Is there anything more unbearable or more unhealthy than water that has been polluted by dead fish? Would it not have been well for our venerable city to have taken this matter into consideration before accepting the scheme? As you have been kind enough to permit anyone to use your columns to discuss the water schemes, I have taken the liberty of encroaching on your valuable space to place these questions before the public generally and draw, if possible, a reply from some undoubted authority on the subject.

FISHERMAN

It may seem strange to many interested people (property holders especially) that members of the council who are particularly silent on "questions of the hour" while at the council board should make a personal canvass of the community in the interests of a scheme, project, or enterprise that they disclaim any connection with directly or indirectly. Aldermen who are silent at the Council board should be silent outside of it on matters that interest the general constituency. The hat generally fits the head that wears it.

WHAT WE MAY EXPECT.

A spell of fair weather.

Regular passenger trains to arrive in Vancouver from the Atlantic seaboard.

A municipal fight of "the running fire order" on water works, sewerage, and garbage matters, and much tardy municipal proceedings in connection therewith.

A defeat of any proposition asking for money from ratepayers which is not backed by sufficient proof of careful and cautious investigation.

A by-law to support the Coquitlam water works scheme.

The discharge of special police or an indignation meeting.

More Chinese slave laborers to clear the townsite,

Many, or most of our readers, will be surprised to learn that the committee appointed by the City Council to examine the propositions made by the Coquitlam Water Works Company failed to "report progress" at last night's general meeting of the city fathers. In this connection there may be other surprises, if things go, as they seem to be now drifting.

PROFESSIONAL ABILITY ACKNOWLEDGED.

Mr. George A. Keefer, M. Inst. C. E., who has been associated for half a lifetime at least, with Canadian public enterprises has been appointed by the Dominion Government to inspect and report upon the condition of the C.P.R. Pacific coast division, left Vancouver today to go over the line between this point and the summit. No doubt applicants at Ottawa were numerous, but no better scrupulous or more impartial selection could have been made among Canada's best and most careful engineers. Mr. Keefer will probably be engaged a month at least in examining the portion of the road given to his inspection, and will return at the end of that time to the coast line where he has important interests.

R. C. CONCERT.

The concert given last night by the ladies of the R. C. Church was without exception the most successful and most pleasant affair of the kind that a Vancouver audience has had the pleasure to attend. The arrangements were excellent and carried out to perfection, each and every one of its promoters doing their utmost to make it pleasant for all who attended.

The rink was comfortably filled, so much so that the first intention of having a promenade concert was only partially carried out, owing to the lack of space after a large portion of the audience had taken seats. The programme was an excellent one and carried off successfully to the end, every person on it doing full justice to their part. The great event of the evening was the vote on the two water works schemes—Capilano and Coquitlam. The cake was carried off by Capilano, the vote standing 649 and 385 respectively. Exactly \$100 was cleared on this venture which made it the greatest success, financially, of the occasion. During the interval between the first and second parts Father Fay made a neat little speech thanking those present for their attendance and the ladies for the good work they had accomplished in furthering the success of the entertainment. All through the evening refreshments of every kind were displayed most temptingly on the tables and the pretty faces and gentle pleadings of the ladies induced many present to find a fictitious appetite which under other circumstances would not have been so easily produced. Mrs. Martin, Mrs. Cargill and the other ladies who did so much and worked so indefatigably for the pleasure of all present, cannot be too highly commended for the manner in which they carried out their self-imposed duties, and deserve the thanks of the whole congregation for the aid they lent towards making the evening a grand success. The programme closed with the National Anthem, and all departed satisfied they had enjoyed the most pleasant entertainment ever given in Vancouver.

CAPILANO CORRALES THE CAKE.

As will be seen in another column, the vote for the confectionery to go to the most popular water works scheme before the public was won by the Capilano people 649 against 385 for the Coquitlam.

TUESDAY MORNING, APRIL 12.

The committee of the Council appointed to report upon the Coquitlam Water Company's scheme made their report to the meeting of the Council last night. After a lengthy discussion the report was adopted, but the action to be taken by the whole Council on the same was left open for settlement at a special meeting, which, it was understood, is to be held on Wednesday evening next. Want of space compels us to defer further comment on the matter until our next issue.

A communication from the special committee on the water works enquiry was then read, stating:

The committee met the Directors of the Coquitlam Company on the 7th inst. and begged to submit the following progress report.

After a long discussion on points in connection with the proposal submitted by the Water Works Co, it was agreed that the solicitor of the Water Works Co. should prepare a draft form of agreement based on their proposal submitted to be laid before a special meeting of council to be called by the mayor for the purpose of considering the same some day before the 18th inst.

We beg to suggest that as the Water Works Co., agree to furnish to the corporation plans of the proposed works, that the opinion of Herman Schussler C. E. San Francisco, Engineer of the Spring Valley Water Works Co., be obtained thereon. We recommend that the Water Works Co. deposit to the credit of the city, cash or city bonds to the amount of 5 per cent on \$280,000 before the execution of the agreement between the Company and the Corporation.

A lengthy verbal discussion ensued among the Aldermen on the report as read, which finally was adopted, the question of as to who was to bear the expense of the civil engineer's report being deferred for further deliberation in committee.

THE NEWS-ADVERTISER FOR SALE.

The NEWS-ADVERTISER is for sale at news stands for five cents per copy. It is also for sale on the streets of this city, New Westminster and Port Moody at the same price. It is for sale at the office of publication at five cents per copy. Respectable advertisers can buy space in the advertising columns at the regular advertised rates. The editorial columns are not for sale at any price. Furthermore when an advertiser brings and pays for a certain portion of the paper he does not come into immediate possession and control of the publication, which will try to swing along and come out every day full of news, whether he continues to advertise or not. Some people fancy they should direct the conduct or combine to direct the conduct of a newspaper, and that the influence of their patronage is "life or death to the enterprise." The NEWS-ADVERTISER does not feel that way. Every advertiser and every subscriber stands upon the same footing. Uniformity of rates is the guiding principle of this newspaper, and we trust our patrons will recognise the honesty and straightforwardness of these intentions.

WATER WORKS QUESTION.

As was reported in our issue of yesterday, the Committee of the council appointed to examine into the proposal of the Coquitlam Water-works Company made a report to the Council, and which was accepted, but laid over for action to be taken upon it at a special meeting to be called on some evening this week. The NEWS-ADVERTISER has, up to this time, refrained from any expression of opinion, merely reporting from time to time the progress made in the negotiations to provide the city with water. But we think the time has now arrived when we should speak and that too in no uncertain way. We may first say that we have no preference for one scheme or the other as regards the personnel of the two companies or the respective localities where they propose to obtain the supply of water. All we are concerned about is that the city obtain an abundant supply of water sufficient for the probable requirements of the city with its possible growth for the next twenty years, that the water so furnished shall be of a pure quality, and that the cost of obtaining such a supply if the city is to be called upon to guarantee bonds or in any other way make itself responsible on behalf of the company proposing to furnish the water, shall be kept down to the lowest figures at which it is possible to construct the works to bring the water here and distribute it. Having now stated as we think what the citizens of Vancouver desire in this matter, we will briefly review the course of events from the first consideration of the plans for carrying out the desired end down to the present time. Upon its being made known that the Council were prepared to entertain propositions for furnishing water to the city two companies, duly chartered submitted proposals. One proposed to take water from the Coquitlam, the other from the Capilano. In the original propositions the latter as regards the guarantee asked from the city was by far the more favorable. But for the purpose of this article we need not go into this now, suffice it to say, that after various conferences between the representatives of the two companies and the council it was resolved that the city should accept the proposition of the Coquitlam company. Now as to the respective merits of the two schemes we do not now propose to discuss. To discuss this intelligently would require us to go into the details and discuss many technical points, which it is not necessary for us to do, although we propose to go into this subject in a short time. To recount the history of the event as



Scale 3000 Feet to 1 inch



(21)
TARY PROPOSALS

APILANO COMPANY

AN AMOUNT NOT EXCEEDING

3 PER CENT PER ANNUM ON 300,000 DOLLARS FOR 10 YEARS

DO	DO	DO.	DO.
DO	DO	DO.	DO.
DO	DO	275,000 DOLLARS	DO.

OQUITLAM COMPANY

3 PER CENT PER ANNUM ON 1,000,000 DOLLARS FOR 20 YEARS

DO.	DO.	700,000	DO.
DO.	DO.	466,667	DO.
DO.	DO.	280,000	DO.

...the fact that in being pos-
sible of even a fortnight im-
provement in the water works begin to be completed in
the city. The fact is, however, that the purpose of
the opinion of a impartial
hydraulic engineer on the
two schemes. For this
reasoners an important question
is necessarily crossing the Nar-
row, which is necessary to the
...out of the Coquitlam scheme
made it necessary to dismiss
that scheme, as time could not be spared
to investigate the chance of its being
permanently successful even if the pipes
were laid. Having now after weeks of
deliberation accepted the proposal of the
Coquitlam scheme and having appar-
ently accepted the assurance
of that company that there could be no
doubt as to the correctness of their state-
ments and estimates, it was to be sup-
posed that no time would be lost in asking
the taxpayers to give their assent to the
city becoming responsible for the guaran-
tee asked. Time was everything and
delay would be fatal. But what do we
find? The council appointing a com-
mittee to go into the figures and estimates
of the company and say if it could do
what it said! Before commenting on
this let us ask our readers' patience for a
few lines more to follow this to the end.
The committee, after taking two weeks
and meeting the representatives of the
company have recommended that the
scheme be referred to a competent en-
gineer to report whether the works can be
done at the figures named, and if they can,
would the particular kind of pipe propo-
sed be satisfactory? Now, we think, the
committee show excellent sense in their
recommendation; but all the same that
recommendation is a most startling in-
dictment to our mind of the
whole council. If the council
be not competent to decide these
questions, (and we feel sure that not one
of the members themselves would pre-
tend they are) why did they not find this
out at the beginning and notify both the
Companies that they must submit their
schemes to be examined by a proper au-
thority to be appointed by the Council?
But to go on with this extraordinary re-
cital. In order to be able to furnish the
engineer who is to report with the neces-
sary data, it is of course requisite
for him to have full and complete state-
ments as to the cost of pipe, and every
other item entering into the estimated
cost of construction. The Company are
willing to give this but only "confiden-
tially" to the council! Was there ever
such a proposition made by a company
before? The company are to confide to
their Aldermanic friends their figures, but
it is to be "strictly private." The Alder-
men are then to notify the citizens that
in their opinion it is satisfactory and
they, the citizens, are only asked to do
the rest—find the guarantee, which, in
other words is, the cash. We need
add nothing more to this simple
statement of facts. It speaks for it-
self. We desire to see a water works
system completed as soon as possible,
and shall do all in our power to hasten
this end. For this reason, therefore,
we speak out as plainly as we do to-day.
We cannot but consider it certain that if
the Council decide to go to the taxpayers
and ask them to vote their money (for it
amounts to that) for a scheme of which its
projectors will only give the particulars
"confidentially" to the Council, the meas-
ure will be voted down—and it deserves
to be so. The majority of the people de-
sire this public improvement, and con-
sider that the secrecy which has all
along shrouded this Coquitlam scheme
can only be caused by one of two things
—either the company are in possession of
some plan of carrying water which they
want no rival to get hold of, or there is
"something rotten in the State of Den-
mark." On this all our readers are as
competent to form an opinion as we are.

CORRESPONDENCE.

To Editor News-Advertiser.

Sir,—I am glad to see that your paper has taken up the question of water works and also that you have taken a decided stand upon the position in which the matter now stands. As a property-owner in this city I naturally feel a great interest in a proposition which will impose such a large possible burden on all the assessable property inside the city limits. Although an early supply of good water is a thing most necessary for the safety of the health of our people, yet for my part I would rather suffer a little temporary inconvenience than have the Council, for the sake of making a contract at once close an agreement with any company, which should prove not satisfactory. I am not acquainted with the individuals who compose either of the companies, who have charters to supply the city with water, but I hear a great deal of talk round town that there are one or more of the Aldermen who are interested in the Coquitlam scheme. Now, sir, if this be so, should not these gentlemen at once resign their positions as Aldermen? How can they judge impartially on the merits of the scheme, or seek to make the best possible terms for the city, if it is as I am informed? Even an Alderman is only a human being, at least I have always supposed so, and if so he is like most other men, looking after the dollar.

I hope some one who is better posted than I am will go fully into the matter as regards the engineering merits of the scheme, and I also hope that you, sir, will insist upon the full details being made public. If the company don't want to do this, we must beat the scheme at the polls, and so leave the field open for further propositions.—Yours truly,

A PROPERTY-OWNER.

Vancouver, April 13.

Two letters were published in Thursday morning's News accusing the Aldermen of being personally interested in the Coquitlam Water Works scheme and also of being purchased. If the gentlemen making such accusations knew that they were stating facts they would not hide themselves behind an assumed name. It is not going to benefit the discussion or add to the information required by the ratepayers for arriving at a right decision respecting the question, to import into street rumors, or circulate stories about the bribing of Aldermen which apparently are the production of some fertile imagination. What the people want are facts authenticated by the name of those making them, as a guarantee of good faith, so that the charges may be investigated. We do not believe that a single Alderman at the Council Board is personally interested in either of the Water Works projects and we are sure that none of them would sell themselves or the interests of the city to either company. It is wrong, it is unjust to the Aldermen and injurious to the interests of the city to make charges of this kind without producing the proof or giving the public even the name of the writer. We believe that every person interested in the prosperity of the city is desirous of arriving at a right decision respecting the Water Works question and they will certainly not be helped to that decision by letters like those to which we are referring. We do not think that letters of this kind should be privileged but the writers required to sign their names as a pledge of the truth of the statements which they contain. We really hope that the discussion of this important question will not further be degraded by such unworthy insinuations and gratuitous accusations, but that every one will contribute such facts as he thinks will enable the ratepayers to arrive at the merits of the question and that everyone will show his sincerity by signing his own name.

We may say here, also, that if we understand the intention of the Council, the by-law will be submitted as soon as prepared, and that no delay will be caused by the reference to a competent engineer. As the News admits such reference is proper, and if the points submitted which will be, we believe, the construction of the Works at the figure named, and the adaptability of the pipe are answered to the satisfaction of the Council, this would appear to be all that could be fairly asked. The expert's answer to the first question as to the cost of construction, ought to settle that point. The details of the cost of construction submitted to the electors would not throw any more light on the question, unless they were more competent to form an opinion than the engineer to whom the question of cost had been submitted. In that case there would be no necessity for a reference of the matter. If the Council is not competent to form an opinion the ratepayers are in no better a position, and we doubt if the submission of detailed estimates would enable them to arrive at a more satisfactory decision. We will only again say that it is very desirable that the scheme should be decided on its merits and not on suppositions and suspicions as to the reason why some prefer the one and some the other.

(1887)

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SATURDAY MORNING, APRIL 16.

The City Council had a special meeting yesterday afternoon, the principal object of which was the consideration of the proposed agreement between the city and the Coquitlam Water Works Company. In the report of the proceedings of the Council in another column will be found a copy of the agreement taken down when read to the Council. In the course of the discussion on the agreement Alderman Lefevre took occasion to say that the NEWS-ADVERTISER had made the charge that some of the Aldermen were interested in the Coquitlam Company. If the worthy Alderman will take the trouble to refer to our article in Wednesday's issue to which he referred, he will find that the NEWS-ADVERTISER never made any such statement either directly or by insinuation. We feel sure that he will agree with us when we say that in the discussion of this important matter it is desirable that all parties confine themselves strictly to facts, and do not seek either to distort or exaggerate anything connected with the matter.

Before referring to the agreement which the Coquitlam Company desire the City to enter into, we regret that in the discussion which took place on the question of referring the Company's estimates to an experienced hydraulic engineer, none of the Aldermen appeared to see the serious objection to the way in which the Company propose to do it. We must still insist that there is only one way in which the Council can submit the question to an engineer as proposed, and that is that the Council themselves shall be put in possession not only of all the plans and estimates, but also of individual items. They must have, not only the estimates of the quantity of every description of the work, but also the prices at which the Company believes it can be done. Also the field notes should be so full and explicit that the character of the whole length of the line over which the pipes will be laid will be clearly set forth for the understanding of the engineer reporting on the scheme. Furthermore, it appears to us that as none of the Council pretended to say that they have been over the ground themselves, so that on perusal of the statements prepared by the Company, they can verify the correctness of them, it is necessary that the Council employ some competent professional man to go over all these papers. Then when this is done that the Council should themselves forward the whole of the papers, and request an opinion on them. We are asking nothing more than any individual who used ordinary care in his business would do, and surely the Council, as guardians of the people, can do no less. We have not yet heard any argument, which is worth anything, adduced against the correctness of this demand, and we believe that upon careful consideration of this point, every Alderman who intends to do his duty by his constituents will insist upon it. If this be not done, then the Engineer should be requested to come here and go over the ground for himself. We cast no reflection upon the Coquitlam Company because they say they have reasons for not divulging all these items. They have a perfect right to do what they consider necessary to protect their interests, and we also say the Council have to show equal regard for the interests of the city.

And now as to the agreement which the Coquitlam Company desired should be signed yesterday. In the first place it strikes us as extraordinary that the agreement binding the city to such a large amount should not have been submitted to the Council or at least to a committee for examination beforehand. But we think a perusal of one clause alone of the agreement would show that it is an agreement which the Council would not accept if they had time for careful examination of it. Clause four provides that the city will guarantee interest "on the Company's bonds or stock or on a portion of each at the Company's option to an amount not exceeding \$280,000 for ten years in such manner as the Company may require. This is very explicit and the Company could not but be satisfied if they got such a clause agreed to. Alderman Hamilton took exception to the guarantee being on stock and the representative of the company agreed to it. But no Alderman seems to have noticed that the city, under this clause, may some day be called upon to make good its guarantee, and yet find that it has no water works or water supply unless it buys it over again. What is to prevent

the Company should the works after all cost more than the most careful engineer now estimates (and a rise in either material or labor might occur to cause this) from issuing other bonds besides those the city guarantees, the interest on either of a series having a lien prior to those guaranteed, or even upon an equality with them? Then suppose the revenue of the Company will not pay working expenses and the interest on the whole issue of bonds. Default occurs in the interest on the unsecured portion, and the holders of such bonds would, of course, foreclose. If they had a prior series they would sell the property under their mortgage and leave the city to pay the holders of the guaranteed bonds the interest for the time that they might still have to run. If all the bonds were of the same issue, still the city would be in a bad position. The Company may not have drawn this agreement with any such object, but the fact remains that it is so presented to the Council, and being so it serves to show how necessary it is that public opinion should be brought to bear strongly on the Council to prevent the city's interests being jeopardized.

From the tone of the discussion at one period yesterday afternoon several of the Aldermen were apparently willing even now to abandon the idea of getting any report from an engineer, to sign the agreement with this company, and let the work be commenced. We do not say that the Capilano Company would have put any better agreement before the Council. Probably they would not. But their scheme is rejected, and we need not concern ourselves to resurrect it. We believe the people, the more they consider this question of guarantee to any company, the less they will like it. If the city is to provide the means by guaranteeing interest on bonds to build the works, why should the city not build and run the works themselves, and so save the amount they will some day have to pay to some one as the profit on the speculation which is after all carried out on the city's credit. Let no one be afraid to criticise the proposal now before the Council because they may be accused of being interested in another scheme. We have fearlessly pointed out what we consider are dangers to the city's interests, and we look to the people for endorsement of our action. And we feel we shall not be disappointed.

SPECIAL MEETING

Of the City Council to Consider the Coquitlam Contract.

Draft of the Proposed Agreement and Discussion Thereupon.

A special meeting of the city council was held in the City Hall yesterday afternoon at 4 o'clock to consider the agreement submitted to them by the Coquitlam Water Works Co., and to decide on purchasing an edition of the *West Shore* British Columbia number. Present: Ald. Sanders, Lockerby, Mannion, Clark, Hamilton, Humphries, Oppenheimer and Lefevre.

His Worship, Mayor MacLean in the chair.

A communication was read from Mr. Samuel, of the *West Shore* stating that he had got subscriptions to the amount of 2500 copies in the city and asked the council to carry out their agreement with him and take another 2500 copies.

A communication was also read from Mr. Picken asking the city to purchase a number of the "Hand Book of B. C." which he offered at \$100 per thousand.

Ald. Hamilton said he was not prepared to vote on any advertising scheme or pamphlet until the council knew exactly what the pamphlet would contain and if its contents would be what the city required.

His Worship said the city would receive a great benefit from either scheme and said it was almost a necessity to purchase a number great or small.

Ald. Lefevre thought the city should, in justice to the *West Shore*, take some definite action in the matter.

Ald. Clark thought the *West Shore* was a doubtful scheme as he had seen the same thing tried before by the same company, and it was not a success.

Ald. Oppenheimer thought it would be well to lay over Mr. Picken's pamphlet till Monday night and dispose of the *West Shore* scheme immediately.

Ald. Humphries said the city needed no further advertising as it was well enough known now and did not favor any scheme to bring more people into the country.

Ald. Mannion moved that Mr. Picken's pamphlet be referred to a committee of three. Carried. It was also agreed to refer the *West Shore* pamphlet to the same committee.

Ald. Hamilton said this meeting was called for the purpose of receiving the agreement of the Coquitlam Water Co., and moved that the company's advocate be permitted to submit that agreement.

Mr. Corbould then handed in the following draft of

ARTICLES OF AGREEMENT:

"The Coquitlam Water Works Company, Limited, a body incorporated, having their head offices in the city of Van-

couver, witness that the said parties mutually agree as follows:

(1.) The company will construct and maintain in conformity with the provisions of their act of incorporation, a thoroughly efficient system of water works for the supply of the city of Vancouver from the Coquitlam Lake, the work to be completed within one year after this agreement becomes operative.

(2.) The Corporation will guarantee three per cent. interest per annum on the company's bonds or stock or on a portion of each at the company's option to an amount not exceeding \$280,000 for ten years in such manner as the company may require the corporation shall give the guarantee when the main pipe is laid and in operation from Coquitlam Lake to Heatley street, together with three miles of distributing pipes.

(3.) The Company will furnish water for the purpose of protection against fire free of charge, and will place hydrants in the City any point along their line of pipes designated by the Corporation. The Corporation paying therefor annually to the Company for each hydrant fifteen dollars.

(4.) The work will afford a first-class fire protection and will be capable of maintaining in the city a pressure equal 60 pounds per square inch at a height of 100 feet above tide, while delivering 1,500 gallons a minute.

(5.) The City is to have a lien on all receipts up to the amount of its liability for interest and any amount advanced by the City for deficiency under the guarantee will be repaid by the Company.

(6.) Further, in consideration of the Company guaranteeing interest on the bonds of the Company as above specified, the Company will be willing to make over to the corporation of Vancouver an interest equal to one eighth of the total net profits received from that portion of the works embraced in the Vancouver system.

(7.) The Company will furnish the Corporation with approved security to the amount of 5 per cent on the amount on which the guarantee is given that they will carry out the work in accordance with the terms of this agreement.

Ald. Clark thought the water rates should be inserted in the agreement.

Ald. Hamilton pointed out that the company's charter regulated that matter. The rate was \$12 a year for families of and 30 cents a year for each additional head.

Ald. Lefevre thought one of the Aldermen should be appointed as a water commissioner and also that a city auditor should be allowed to examine the company's books and accounts as the city would have an interest in the company in the shape of one eighth of the profit.

Ald. Hamilton pointed out that this would be unnecessary as the charter provided for this particular subject. He then said the clause asking that the city guarantee their stock would have to be struck out as the city had no power to guarantee such.

Ald. Clark said he thought the agreement should not be proceeded with until an expert had given his opinion and that a legal gentleman he employed to give his opinion on the articles and further said that both schemes should be laid before an expert.

Ald. Lefevre said he thought all these things had been discussed and considered. He said the News had accused Aldermen with being interested in the Coquitlam scheme, and he wished the News to point these Aldermen out.

Moved by Alderman Hamilton: "That the draft form of agreement now submitted be referred to the city solicitor and the committee appointed by the Council to confer with the Coquitlam Co., to revise the same and report at some future meeting.

Seconded by Alderman Lefevre and carried.

It was then moved that the City Solicitor be permitted to call in additional counsel in the matter. Seconded by Ald. Lefevre and carried.

Moved by Ald. Mannion seconded by Ald. Mannion that the data placed in the hands of the Council by the Coquitlam Company be sent to H. Schussler, C. E., of San Francisco, and that he be asked whether he will furnish the city a report on the nature and durability of the material proposed to be used; whether the pipes are adequate to give the service specified and an estimate of the cost of construction, naming the earliest date his report could be given and his charge for making the same, and that he be requested to reply by wire as to whether he will give a report.

The Council then adjourned.

NOTE AND COMMENT.

Several members of the Council expressed themselves as in doubt as to the expediency of advertising the city. This was in connection with the purchase of editions of Mr. Picken's pamphlet and the British Columbia number of the *West Shore*. The *News-Advertiser* would like to see a large number of both publications sent to the right quarters.

Ald. Lefevre jumped the track in his argument on the water works question at yesterday's meeting to criticise the *News-Advertiser*. He was glad to see the editor of that paper was there in the flesh to receive the full benefit of his cutting rebuke. The editor was equally rejoiced not to have missed any of the Doctor's radiant remarks spreadeagled on that occasion.

Delays are dangerous, so it was determined by our City Council in deciding upon the water works schemes, but the danger signal seems to have been taken down for repairs, if one may judge by the speed, this question is being brought to a head.

One or two of the Aldermen are very indignant that "a correspondent" is permitted, through the columns of the *News-Advertiser* to ventilate a little street talk that some members of the Council might be interested in the Coquitlam scheme. There is something horrible in the suggestion, we admit, but we don't hold ourselves responsible for the opinions of our correspondents.

We are sorry to see the angry manner in which some of our worthy Aldermen resent any criticism on their actions at the Council board. They seem to imagine that having once been elected, the voters in their respective wards have given over to them entire control of the city and all its interests. Now this is all wrong. When a man has, by the votes of his fellow citizens, been elected to the responsible position of Alderman, he accepts a trust which he is to carry out for their benefit, and he should at all times be willing to receive their suggestions and take in a friendly spirit any criticism they may make. The recent amendment of the charter has made it impossible for many citizens of good repute and who are doing their full share to build up a live city, to be able to qualify themselves for the position of Alderman. But they cannot be deprived of their right to speak on any subject that comes before the Council. Instead of seeking to lessen the interest in municipal matters taken by our people we would strive to encourage it, to get everyone who has a stake here, however small, to give thoughtful consideration to all matters coming before the council, and be free and outspoken in the opinions which such consideration may lead to. This will lead to the Council being kept up to their duties, and to an economical and pure city government.

The water works question is beginning to warm up our curbstone orators. It is a matter that will bear considerable discussion.

After what transpired at the City Council last night it appears to us that there are only two ways in which the action of the Council on the Coquitlam water works scheme can be comprehended, one view being that they are quite incompetent to handle the question properly. The other that they are only anxious to get rid of any further trouble and are therefore willing to throw over any safeguards which a proper care for the interests of the city would require them to have. The special committee appointed to report on the Company's proposal suggested that the Council should send all the data placed before them by the Company to an engineer in San Francisco for him to report upon as regards both the particular material and mode of construction proposed by the Company, and also as to whether the figure named as to its cost was sufficient. The Council adopted the suggestion and added to it the instruction that he should, upon receiving the papers, be asked to reply by telegraph as to whether he would make the required report, and if so, at what cost. So far there was a glimmer of common sense in the action of the Council, except in the matter of the papers to send him, which point we refer to below. But even this order of procedure was not allowed to be carried out, we presume through pressure or influence of interested parties. At last night's meeting of the Council a telegram was read from Mr. Schussler, the engineer referred to in San Francisco, saying that he would report *if he had time*. Upon the representative of the NEWS-ADVERTISER asking how Mr. Schussler had come to telegraph, he was informed that a telegram had been sent asking him the question. So now by Saturday's steamer from Victoria the papers which the Council have will be sent, and when Mr. Schussler receives them he will then advise the company if he can make a report, and if so what it will cost. If in the affirmative the farce will go on, if in the negative, or if his charge is more than the city is willing to pay, then we suppose the papers will be returned and probably the Council will vote that it is perfectly unnecessary to get anyone's opinion.

We use the word "farce" advisedly, because we understand from an official of the Council that the only papers they have from the Coquitlam company which they can send to Mr. Schussler are a profile and contour plan, and anyone who knows anything of such a project will know that this is not sufficient. We shall still insist that the full estimates giving the quantities of every description of material which has to be moved, the prices for same, as well as full details of the pipes must be sent to Mr. Schussler to enable him to make a report worth anything. Also that it is equally necessary for full and complete field notes, showing topography of the country over which the line goes, and the nature of the soil accompanying this. And above all that all these papers be sent by the Council direct to Mr. Schussler. The Coquitlam Company as a matter of mere decency should not think of communicating with a person supposed to be going to give an impartial report upon a scheme of which they are promoters.

We understand that a special meeting of the City Council will be held this evening to consider the agreement between the city and the Coquitlam Water Works Co. as amended by the city solicitor. This being in accordance with the resolution of the Council at their last meeting would not call for any special comment. But we are informed that yesterday a gentleman connected with the aforesaid company was interviewing aldermen with the request that they would agree to include in the agreement a clause to the following effect:

"During the continuance in force of this agreement the city will not construct nor subsidise the construction of other works of water supply for the city."

We have heard of individuals whose appetite grew the more they were fed, and the proceedings of the Coquitlam Company make us think that corporations are sometimes liable to the same disease. Having produced an agreement asking the city to guarantee \$280,000 of an *indefinite and absolutely unlimited* issue of their bonds, they now, having realized that the Council may be led to grant their request so far, begin to think they have not asked enough. But realizing that even a water works corporation must make some kind of show of consistency, they do not venture to again change their figures. They, however, looking ahead see that it is desirable to get some clause inserted, even at the eleventh hour, which may keep the city's credit available for a time when they may again seek to get a further guarantee or subvention.

The present proposition of the Coquitlam company is to end the main pipe at Heatley street, and to give the city three miles of distribution pipe. The final proposition of the company which the city accepted was, that they should give the city sufficient distribution pipes for the city's requirements, but when it got to the agreement last week, it had fallen off to three miles as stated above. We respectfully call the attention of our aldermen to this discrepancy. This is not even now, more than one-third of the city's requirements. If, therefore, cannot be sufficient when the increase of the city by a year's growth is taken into account, and the city will have to provide in some way the funds necessary.

But the Coquitlam Company having by that time commenced to again feel the desirability of another pull at the public purse, will probably come forward in the ingenuous way which has characterized all the negotiations with the Council, and express their willingness to lay the additional miles of pipe required if the city will only again go thro' the merely formal routine of putting its name on the back of some more of the company's bonds. Then will be apparent the prescience and sagacity of the company in preventing the city injuring its credit by guaranteeing or endorsing in any way any other scheme for water works, even though circumstances should arise which would not only make it very desirable, but even necessary to have an additional and independent supply—a contingency that is quite likely to arise as we will show when the time comes for discussing the scheme on its own merits. Meanwhile taking a careful review of all the proceedings in this extraordinary negotiation, and noting the ease with which the company have got the Council to agree to all their demands, we cannot consider as extravagant the chorus of these promoters:—"The Council is ours, give us the earth."

The ever shifting opinion of the great big public which includes the tax-payer, no matter whether it lives in a large or small community, begins to be felt on our local water works question which is just now before the public. The independent and outspoken attitude of the News-ADVERTISER has awakened public interest in this most important piece of municipal legislation, and the current of favor seems to fully endorse the measures proposed which will insist upon a full and complete exposition of the plans and agreements of the Coquitlam company and the position to be assumed by the city council. Apparently the opponents of the opinions of this journal may be found confined to the small class of people who are actively engaged in canvassing the Coquitlam scheme to furnish the city with a water works system almost on their own terms. The representative voters, taxpayers and citizens we meet every day endorse the determination to have matters put into business like shape in a contract in which there are no loopholes of escape from well understood responsibility. With scarcely a single exception, outside of interested citizens, we hear of a universally strong desire to have a re-examination of both water-works schemes laid bare before the public. The Coquitlam company, as it now stands, is considered to be too uncertain, vacillating and at times exacting to inspire confidence. Public opinion has not become so much changed as it has become decided and determined, and there is but little doubt in the minds of those who have been aroused to the importance of the issues at stake that a strong movement is in the course of rapid formation to sift this matter to the bottom and force full explanations from all sources. The city is young but it is sufficiently old to guard its dearest interests as it enters the new era of its assured success. The solid men of the community whose stake here is sufficiently large to make permanency in the place profitable, will see to it, that the youthful metropolis is not saddled by contracts there will be any difficulty in fulfilling.

One or two persons, whose biased minds need grading have come to the conclusion that the News-ADVERTISER is "down on the council." Nothing is further from fact. The members of the city council are elected by qualified voters from all quarters of the city. Confidence is reposed in these men by the taxpayer when his vote is cast. This is the class this newspaper proposes to represent when any city interest is at stake, and we will do it fearlessly. Why should a daily journal oppose or obstruct a council board? Its interests might lie the other way, supposing any money making scheme was afloat, say nothing of city patronage. We disclaim, however, any desire to influence the council or any of its members, or the constituents of any representative at that board, but we do proclaim in unmistakable language that the interests of this new and promising city, so far as the News-ADVERTISER is concerned, will be closely looked after. If any member of the council feels aggrieved or thinks his actions, as an alderman, have been misconstrued or his motives misrepresented, our columns are open to receive his explanations. Little if any note has been taken of street corner discussion, even where aldermen played the role of orators, but the public are concerned and we are concerned with the public.

ANOTHER meeting of the "special committee" to look into the Coquitlam water works contract, and another special meeting of the city council to ratify or reject the proposed agreement has been held. The progress made is of that peculiarly indefinite character that our report will give our readers little or no satisfaction.

CORRESPONDENCE.

To the Editor of the News-ADVERTISER:

SIR,—I notice with satisfaction the position you take upon the very important question of the water-works. It is not my intention to trouble you with a discussion of the comparative merits of the two schemes, but I believe that so far the council have decided aright in preferring the Coquitlam as the safer of the two. Next to the air we breathe a plentiful supply of good cheap water is of the utmost importance, and a great responsibility rests upon the council in this matter. I suppose it is too late in the day to advise a course which is being followed largely in England and elsewhere to great public advantage, that is, the construction and control of their water-works by municipalities themselves, thus securing the adequate supply of a necessary article at net cost.

Without any reflections upon the character of the gentlemen composing the Coquitlam Co., it is tolerably certain that very few dollars of their money will be laid out in their work. It will be done with money borrowed on the city's security, and no doubt the construction account will be charged up with good round fees for all sorts of professional services, legal, engineering, &c., to the benefit of the members thereof, "their uncles and their cousins, and their aunts," and it behoves the taxpayers of this city to see that this matter is sharply looked after, and that the city fathers, or any of them, should be careful of the trust reposed in them. Monopoly should not be tolerated, the right to purchase at any time reserved—and as a corollary to this—and looking to the future, that the whole scheme should be carefully considered in its conception by the best available authority, and later, in construction; proper supervision should be provided for both, as to the details of works and economic management of the same, for after all it is the city who will have to pay the bills—that you can bet on. The News is doing yeoman service in this matter. Go on, and prosper.

WATCHMAN.

wild waves saying—water works.

WHAT WE MAY EXPECT.

Another shuffle of the Coquitlam cards and bad play on the part of the projectors.

The biggest kind of a row unless the city council thoroughly sift the proposed agreement and get right down to straight business.

More sunshine that shadow and spring suits in abundance accordingly.

Lots of fight on the water works scheme but the tax-paying majority to win.

A meeting of the special committee appointed by the city council to examine into the Coquitlam scheme was held yesterday morning, and the agreement as altered by the city solicitor conjointly with Mr. Blake, was laid before the committee and approved.

Ald. Clarke moved that 100 copies of the agreement between the city council and the Coquitlam water works company be printed. Seconded by Ald. Humphries. Carried.

Council adjourned at 10:45 p. m.

(1887) (32)

SUNDAY MORNING, APRIL 24.

In accordance with the resolution passed by the city council the proposed agreement between the city and the Coquitlam water works company having, as we presume, been examined and approved by the city solicitor, a number of copies of it have been printed and circulated for the information of the citizens.

We have carefully perused the same, with the result that we are unable to see that the agreement now drafted is in anyway more advantageous to the city than the draft agreement laid before the council by the company on the fifteenth instant. There is to be sure a clause added as to the non-employment of Chinese on the construction, but if we remember rightly, that is prohibited by their charter.

The agreement as we are informed will be laid before the council on Monday evening next for ratification. Believing as we do that such an agreement is one that it is not for the interests of the city should be entered into, we again call attention to the points in it which are objectionable. This matter is not one which is of interest only for the present. For ten years will the city be bound by it. In the course of the next two or three years it is quite probable that the city will have to negotiate further loans for various improvements. To obtain these loans on the best possible terms it is necessary that this city enter into no agreements which may impair her credit in the money market. A failure in the waterworks system which it was known the city had guaranteed the interest of, would be very prejudicial. It would be far worse if by any action of the present council it should turn out that for its own protection the city had to buy out the works, and that too at a price far beyond what the actual cost of the works had been. Yet the agreement now proposed to be signed not only makes this possible, but, as we will shew, makes it really to the interest of the Coquitlam company to bring this about.

The first objection we make to this agreement is that it is not the embodiment of the proposition made by the Coquitlam Company on March 14th last as set out in their own proposition submitted to the council by Mr. E. A. Wilmoet. This proposition was printed and circulated by the company amongst the citizens as shewing what they asked, with some modifications made by the council, and which they agreed to, accepted by the company. This, therefore, is the proposition which the council has had before it, and it cannot agree to make any important modifications in favor of the company without grossly abusing its position as stewards for the people. It was because that proposition was more favorable than the Capilano company's scheme that the latter was rejected. But now when the other company is out of the way the Coquitlam company come in and put before the council a scheme containing quite

different proposals, and pretend that it is merely the original proposal, and, therefore, should be accepted at once. In the original proposition of March 14th the company say: "The corporation is asked to guarantee 3 per cent. interest per annum on the company's bonds to an amount not exceeding \$280,000." There can be no doubt as to what the company intended should be the conclusion arrived at by any one reading this clause, namely, that the city should guarantee the bonds of the company, and that the amount of such bonds would be \$280,000. Now let us refer to the agreement which they are now trying to cram down the throats of the council. The 4th clause of the agreement which they now ask the city to sign says (after setting out what the company proposes to do in the way of construction) that the company "promises and agrees to and with the said corporation to so construct and equip the said waterworks system within one year after a bylaw guaranteeing interest at the rate of 3 per cent. per annum on the company's debentures or stock, or on portion of each, at the option of the said company to an amount not exceeding the sum of \$280,000 for the period of ten years in such manner as the company may require. We think all our readers will at once see what this means. That the company can require the city to guarantee either stocks or bonds, and also that it may be only a portion of either the stock or the bonds which the company may issue, and if it be the bonds, that it need not necessarily be first mortgage bonds. In other words the company may mortgage its property for all its cost, or more if it can get people to buy the bonds, and make the city guarantee a dividend on its stock. In this case it would represent just so much clear gain to the promoters. Or it may decide to issue bonds to the amount of \$400,000, or any other sum, and ask the city to guarantee \$280,000 of this sum. The whole of these bonds being secured by one mortgage the holders of the \$120,000 over the amount guaranteed by the city would have in this proportion the same lien on the works as the bondholders secured by the city. Now suppose the revenues not sufficient to meet the current expenses and interest on all of this issue of \$400,000 of bonds. The bondholders foreclose and advertise the property for sale. The city for its own protection, decides to buy the works and is willing to pay the cost for same, \$280,000. But it finds that it is mortgaged for the sum of \$400,000, and unless it agrees to bid up to that, outside parties may, and the city must submit to their terms. Default in the payment of even one bond would require foreclosure of the whole amount, and we might have the pleasing sight of some one collecting from the city the interest on \$280,000 for several years after the works had passed into the hands of other parties and the inhabitants of Vancouver were paying a heavy tax for water

"Now it will take but a few words to show that no hardship can be claimed by the company if the city insist upon the guarantee being on bonds alone for the

whole sum of \$280,000, and also that these bonds shall represent the whole sum to be secured by a first mortgage on the works. Our readers will remember that the company claim that \$280,000 is ample to construct the works, and so sure are they of this that they are taking the trouble to get their figures verified by an impartial expert. Now if this sum be sufficient to construct the works on the plan they propose, they cannot want to issue any more bonds. And if they do not require any more bonds, why should they object to have the city's guarantee put on bonds secured by a first mortgage on the works for that sum alone? They cannot, and if the council agree to anything else they are deliberately sacrificing the interests of the people. We could give several reasons why the company should wish to have the power to issue more. For instance, it requires no great perspicuity to see what a nice thing it would be for these gentlemen to be able to get New Westminster to guarantee a further sum.

We have not space to go at length into the other objections to the agreement, serious as they are. We may briefly mention:

1st. That the company do not give a "thoroughly efficient system" as in their proposition of March 14 because the three miles of distributing pipes will only reach down the length of one street, and back on another. There are already about $7\frac{1}{2}$ miles of planked streets, thus there will be to-day some $4\frac{1}{2}$ miles without any water system, and any increase by the time the works are completed must be added to this.

2nd. That the clause as now worded giving the city a "lien on the receipts of the company" for any sum paid by the city under its guarantee is not of any value, because the bonds will be a first lien on all the property of the company, as they could not otherwise be negotiated, and the city being notoriously a consenting party and privy to this could not pretend to set up any claim against a bona fide holder of a bond.

We cannot therefore but come to the conclusion that the agreement is one that the council must reject. They are bound to do in this matter as aldermen for the interests of the city what they would do in their own private affairs, and we ask them would they in that case enter into such a bargain? It is not enough for them to plead that they are not lawyers. They are supposed to be men of business, and if so they would not sign an agreement they did not understand. If therefore our objections are wrong, they can point out where the error is. If they cannot do this, there are only two conclusions to be arrived at. One is that our arguments are unanswerable. The other is that they are not capable of handling the question. In either case therefore they must as the only safe course refuse to sign the agreement unless amended. The suggestion that they can sign the agreement and then leave the people to decide whether they are right or wrong, is too absurd to require consideration.

(1887)

(40)

TUESDAY MORNING, APRIL 26.

In a sitting which lasted till early this morning the council discussed the proposed agreement with the Coquitlam Waterworks Co. The draft agreement as it left the hands of the city solicitor after conference with the representative of the company has been circulated widely amongst our citizens, and in our issue of Sunday we called attention to some of the most objectionable clauses and conditions which it contained. As we then shewed it was in many most vital points a very different proposal from that originally made to the council on the 14th March. The criticism passed by us during the last two weeks on some of the conditions of the proposed agreement which the Coquitlam Company desired to get the council to accept, and the growing public feeling which that criticism has brought out, had great effect, and the agreement as it left the hands of the council this morning is very different from what the company intended. For this we are thankful, but until we see the clear and complete draft of the agreement as now changed and amended, we are not even yet prepared to say that it is one such as we can recommend the people to vote for when it is put before them.

We may, however, state that the proposal to guarantee "stock" of the company is absolutely struck out, the words "debentures or stock or either of them" disappearing, and the word "bonds" substituted. The intention of the majority of the council, as we understand it, is that the sum of \$280,000 in bonds of the company shall be guaranteed by the city, and that its whole bonds shall not exceed this amount. If this be clearly expressed in the agreement we shall be satisfied. The clause however, to prevent any misunderstanding should state that they are first mortgage bonds, and that they constitute the whole of such issue.

The assignment of the one-eighth of the total net profits has also been extended from the period of ten years, that is during the existence of the guarantee, so as to make it a perpetual assignment. This also is satisfactory. The other alterations made in the agreement are all favorable to the city, and upon the whole we must congratulate the council on their evening work. Ald. Alexander, Clark and Hamilton were especially strenuous in their exertions to protect the city's interests. Provided therefore the revised agreement be actually framed as we now understand it we consider that it may be put before the voters as a contract fair to both parties. Should it, however, appear on examination of the contract when fairly engrossed that it is not so worded, and the council still pass it, it will still be for the voters to reject it at the polls. As to the merits of the scheme itself we do not now of course express any opinion.

THE CITY COUNCIL

The Agreement with the Coquitlam Company Amended and Finally Passed.

Many of Its Most Objectionable Features Struck Out, and the City's Interest Better Protected.

The regular meeting of the City Council was held last night at the usual hour.

Present: Ald. Lefevre, Lockerby, Oppenheimer, Sanders, Mannion, Hamilton, Humphries, Alexander and Clark.

His Worship Mayor McLean in the chair.

WATERWORKS.

The agreement between the city council and the Coquitlam Waterworks Co. came up for discussion.

The council went into committee on the whole, Ald. Mannion in the chair, to discuss the agreement clause by clause.

Ald. Hamilton moved, that the words "or stock, or either of them, or on part of either, etc., etc.," be erased, seconded by Ald. Clark and carried.

The word "debentures" be erased, and the word "bonds" inserted, and "in such a manner," erased.

The clause as amended was read and passed.

Ald. Clark said as there was now $7\frac{1}{2}$ miles of streets he did not think that three miles of pipes would be enough for efficient service.

Mr. Corbould said the company had no intention of stopping when the three miles of pipe were laid. The company could get no revenue until the city was thoroughly supplied, and that ought to be a sufficient guarantee that the company are in earnest.

Ald. Alexander thought the city was to be asked for no guarantee until the works are completed. If the revenue did not reach 3 per cent. on the \$280,000 at the end of the second year after the works were completed the city would make up the shrinkage. He wished to know how the interest would be paid on the bonds for the first year.

Mr. Corbould said the city would not be asked to guarantee anything until the first year was over.

Ald. Alexander wanted to know when the bonds would be dated.

Mr. Corbould said it did not make the slightest difference.

Ald. Alexander asked if the city had to draw up another agreement when the pipes reached Heatly street.

Mr. Corbould: Not if the agreement is drawn up properly.

Ald. Alexander said there ought to be a clause to the effect that the company guarantee to build more than $3\frac{1}{2}$ miles.

Ald. Hamilton read an extract from the "Act" which forced the company to extend its pipes as the city required it.

Ald. Alexander moved that the words "during the existence of said guarantee," be struck out in the old agreement. The

company offered to make over one-eighth of the profits to the city—did that mean for ever or a limited time.

Mr. Corbould: All our plans are based on a limit of ten years.

Ald. Alexander thought the company were asking too much and were dictating to the council.

Mr. Corbould said the company had no such intention, concessions were necessary on both sides.

Ald. Alexander said the company should be bound to a further extension of their works than stated in the agreement.

Ald. Alexander's motion was put and carried.

The next clause was read and the word "debenture" changed to bonds.

Ald. Lefevre thought it was better to adjourn, as it would give the committee a chance to go further into the agreement with the company.

Ald. Alexander said the last proposal of the company was not so advantageous as the former one, he thought the Coquitlam Co. should hand in a proposal which would either be accepted or rejected.

Mr. Corbould said that is what the company had done; the solicitors of the city had drawn up the agreement now before them.

Ald. Hamilton said he did not know how the solicitors had drawn up the agreement in its present form.

Ald. Alexander said he understood that the city should be supplied with water free of charge for all time to come; the offer was on a 10-years basis now.

Ald. Hamilton moved to erase "or stock or," etc., "in such manner," "during the continuance," etc. Carried.

The clause (4) was read and passed.

Clause 4 was read and the words "during said period," erased after which it passed.

Clause 6 was then read and the words "during said period" erased, and the words "but in any case shall not be less than 14 inches in diameter" inserted. The clause then passed.

Ald. Hamilton said if the company failed to carry out their work properly the city should have the privilege to take the work out of the company's hands under this agreement, and it should be worded to that effect.

Mr. Corbould said if the agreement was not carried out the city had recourse to the court for address.

Clause 7 read and the words "stock or debentures" erased and "bonds" inserted. The clause then passed.

Ald. Humphries said the city might want more than one-eighth of the profits. (Mr. Wilnot said he did not know but the city might want half of the profits.)

Clause 8 was then read and the words "first lien on the receipts of the said company" inserted after "shall have."

In consequence of the pressure on our space to-day we are unable to find room for a full report of the remainder of the discussion. Suffice it to say that the remaining clauses, with some unimportant alterations, were agreed to, and upon the motion of Ald. Hamilton the agreement as now amended was referred to the city solicitors for the purpose of putting it in a proper shape for completion by the two parties thereto.

The council then adjourned early this morning.

VANCOUVER, April 20.

To the Editor of the News-Advertiser.

SIR,—If I understand the report of the proceedings of the City Council last Monday correctly, the Coquitlam Company do not have to put up their forfeit with the city for thirty days after the by-law is carried.

Now supposing that after the city has gone to the expense of the election the Coquitlam Co. think better of it, and back out, who is going to pay the expense which the city is put to in holding the election?

Probably they have too good a thing to make them withdraw, but I would like the Council to get them to put up at least sufficient for the expense they are about to incur.

Yours,

A RATEPAYER.

COPY OF THE AGREEMENT

With the Coquitlam Water Works Company as Approved by the City Council.

THIS AGREEMENT.

made the _____ day of _____ one thousand eight hundred and eighty-seven.

Between the Coquitlam Water Works Company, Limited, a body corporate, having its head office at the City of Vancouver in the Province of British Columbia, hereinafter called the company, of the first part, and the Corporation of the City of Vancouver hereinafter called the corporation of the second part.

Whereas, the said company by its acts of incorporation (being chapter 33 of the statutes of 1886) is empowered to take water from the Coquitlam Lake and lay pipes and do all things necessary for the purpose of bringing and distributing such water within the limits of the City of Vancouver.

And whereas, the said company has asked the said corporation to guarantee interest at rate of three per centum per annum on its bonds, not exceeding in the whole the sum of two hundred and eighty thousand dollars for the period of ten years.

And whereas, the said corporation has agreed to furnish by by-law the said guarantee, so conditioned as to become effective from and after the time the said company shall have laid its main pipe from the Coquitlam Lake to Heatley Avenue, in said City of Vancouver, and shall have laid three miles of distributing pipes within said city, in consideration of the covenants, promises and agreements hereinafter made by the said company, and of the assignment of an interest equal to one-eighth of the total net profits received from that portion of its works within the City of Vancouver from said company to said corporation.

Now this Indenture witnesseth, that in consideration of the premises the said company, for itself, and its assigns, covenants, promises and agrees to and with the said corporation that the said company will construct, equip and maintain during the said period, in conformity with its act of incorporation, a thoroughly efficient system of water works for the supply of the City of Vancouver and its inhabitants with water from the Coquitlam Lake, and further covenants, promises and agrees to and with the said corporation to so construct and equip said water works system within one year after a by-law guaranteeing interest at the rate of three per centum per annum on the company's first mortgage bonds to an amount not exceeding the sum of two hundred and eighty thousand dollars for the period of ten years in such manner as the said company may require, shall have been finally passed by said corporation and shall have become law, and thereafter to maintain a thoroughly efficient water service in and for the said city and its inhabitants in manner following, that is to say:

The said company shall from time to time and at all times after the lapse of one year from the final passing of said by-law, furnish for the protection of the City of Vancouver from fire a good and sufficient supply of water free of charge to the said corporation, and will place hydrants at any point along their line of pipes within the limits of the City of Vancouver required by the said corporation, said corporation paying to the said company the sum of fifteen dollars per annum for each, and every hydrant so placed as aforesaid.

And the said company hereby, for itself and assigns, covenants and agrees with

the said corporation that the said company shall and will provide, construct, equip and maintain such water works as will be capable of and shall maintain a pressure in the city as aforesaid, equal to sixty pounds per square inch at the height of one hundred feet above sea level while delivering fifteen hundred gallons of water per minute and the main shall be sixteen inches in diameter or of sufficient capacity to furnish the above discharge, but in any case shall not be less than fourteen inches in diameter.

And the said company hereby agrees that in consideration of the said corporation guaranteeing interest at the rate aforesaid on the bonds of the said company, as aforesaid, that it, the said company, will, by good and efficient assignment, transfer to said corporation an interest equal to one eighth of the total net profits received from that portion of its water works within the City of Vancouver.

And the said company for itself and its assigns further covenants and agrees to and with the said corporation that the said corporation shall have a first lien on the receipts, of the said company, over and above working expenses, up to the amount of the sum paid by the said corporation on said guarantee of interest as aforesaid, and any amount advanced by the said corporation for deficiency under the guarantee shall be repaid by the said company to the said corporation.

The phrase "working expenses" shall mean and include all expense of maintenance of the water works and of the belongings thereto, and of the stock and plant used in the working thereof, also all the rent, expenses of and incidental to operating the water works including stores and consumable articles, also rates, taxes, insurance and compensation for accidents or losses; also all salaries and wages of persons employed in and about the works and all office management and legal expenses.

And the said company, for itself and assigns, further agrees with the said corporation that the auditor or auditors from time to time appointed by the said corporation shall have free access at all reasonable times to the books of the said company, sub-section 80 of section 142 of the Vancouver Incorporation Act, 1886, and amendments thereof, as to appointment of the Mayor or an Alderman director of a company, the stock of which shall be guaranteed by the city, shall be deemed to be incorporated with and form part of this agreement during said period.

And the said company, for itself and its assigns, further covenants and agrees to and with the said corporation, that not later than one month after the said by-law guaranteeing the interest on the said bonds have been finally passed and become law, that the said company will furnish the said corporation with approved security to the extent of five per centum on the amount for which the guarantee of the said corporation is given, that if the said company will comply with all its covenants, promises and agreements with the said corporation, as to the completion of said works, said security to be forfeited to the said corporation in case of failure on the part of the said company to perform and fulfill its covenants, promises and agreements otherwise to be returned to said company.

And it is hereby further covenanted, and agreed, by the said company that they shall not employ any Chinamen or person of the Chinese race in or about the construction, maintenance or equipment of their said water works system to the City of Vancouver or within the limits of said city.

SATURDAY MORNING, APRIL 20.

We print to-day a copy of the agreement between the city and the Coquitlam Water Works Company as it was passed by the Council at their meeting on Monday last, and as it has been engrossed by the city solicitor. The agreement was on Wednesday transmitted by him to the company, and we understand that they intend to accept it, and it is, therefore, probable that it will be returned duly signed by them before the next meeting of the Council, in which case, we presume the Council will on Monday night give instructions for the publication of the By-Law authorising the city's guarantee being given for the interest on the bonds.

If the By-Law be approved by the people then the company has one month from the date of its passage in which to deposit the security of five per cent, on the amount of guarantee. When this is done the preliminaries between the city and the company are concluded.

The agreement, as now finally approved by the Council, is one very different from that which the company submitted some two weeks since, and is more like the proposition they made to the Council and which the Council decided to accept. In our comments on the agreement in our issue of Tuesday last, we said that if the whole amount of first mortgage bonds which the company could issue were limited to \$280,000 we thought that it should be satisfactory to the city. But the agreement as now completed clearly does not have the effect of binding the company to that, although several of the aldermen told us that they supposed it had. Although, therefore, the Council has approved of the agreement without this proviso, we still think it is one that the people must insist on. We cheerfully admit that the Council have struck out or amended several very objectionable conditions, and the company have acceded to these new conditions. But the limiting of the issue of these bonds is still, in our opinion, very important for the city's interest. We have heard it stated that it is not necessary to put any such clause in the agreement because there were certain things which would prevent the company being able to float any more bonds than the amount bearing the city's guarantee. We think, however, that it is not difficult to show not only that this could be done in any ordinary condition of the English money market, but that the company could probably so arrange that they could get a good price for their bonds outside the \$280,000. We have not space to-day to discuss these questions, but we propose to do so in our issue of tomorrow and also to refer to one or two other points in connection with this agreement.

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In this issue we publish a letter from Mr. E.A. Wilmot, of the Coquitlam Waterworks Company. A perusal of that letter causes us both surprise and regret, as it shows that even at this late stage of the controversy Mr. Wilmot is not aware of the real point involved in the discussion. We have never said that by not limiting the amount of the first mortgage bonds which the company could issue that the liability of the city for interest would be increased. We supposed that everyone who knew what it was it proposed the city should do, would be sufficiently well informed as not to fall into such a gross blunder as Mr. Wilmot supposes possible. And as we presume that the question he submitted to the agent of the Bank of British Columbia was that which he states in his letter, we need not refer further to this, because we are thoroughly agreed with both those gentlemen on such an A B C proposition. What we have said is that it would be injurious to the interests of the city to allow the company to issue first mortgage bonds for any sum over the amount on which the city guarantees the interest, namely, \$280,000, and also that the company cannot claim they are being unfairly dealt with by this limitation being made. And these two statements we repeat to-day. For Mr. Wilmot's benefit, with the indulgence of our readers, we will again state one or two reasons why the company, if they intend to act fairly with the city, cannot object to this demand.

They came before the council and said they were prepared to construct the works giving the city an efficient water supply if the council would guarantee their bonds to the amount of \$280,000. When some doubt was expressed as to this being sufficient for the purpose, they maintained it was, and have sent their estimates and calculations to an independent engineer for confirmation. It is not the city's business if, in order to compete with the offer of the Capilano Company, they have put their figures so low as to leave nothing over the actual cost of the works. They fixed their own price, and it is on their own statements we are arguing. They have never pretended that they were going to put one cent into the works beyond what they got by the sale of bonds, and if the amount of these is the same figure as their estimate of the cost of the works where does the company suffer any hardship by the limitation we ask?

But the company alleges as reasons why they should issue more bonds than the amount of \$280,000 that it is possible contingencies may arise which may increase the cost, and also that they desire to largely extend the system of distribution beyond the three miles mentioned in the agreement. To the first reason the objection that every disinterested party would make is that they fixed their own price, and it is presumed that as business men they made calculations for all probable contingencies. If they did not then it is not such a company as the city could repose any confidence in, and it is the more necessary a limit should be put on the amount of bonds. As to the second reason it is sufficient to say that the agreement between them and the city only refers to the works down to Heatley Avenue and three miles of distribution pipe, and the city having nothing to bind the company to do anything more than this, cannot consent to the issue of bonds for something of which they have no cognizance.

But the singular part of the matter is, that whilst on the one hand the company are resenting, as a great injustice to them, any attempt to limit the issue of bonds, they are at the same time saying the city need be under no apprehension that they will seek to do so because it is impossible for them to float bonds beyond the actual cost of construction. That capitalists

would see that the sum of \$280,000 was such cost by the agreement with the city, and also without the city's guarantee they could not float them. Then why their refusal to limit the bonds? We think it is very easy to answer this question. The company at present has a charter which gives them the right to divert and use the water from the Coquitlam, and also the right of eminent domain necessary in order to allow them to bring the water across the property of others. Under the circumstances of the case they will practically enjoy a monopoly for some years in the supply of water to this city. Now with the ordinary growth which we may expect this city to make, such a company possesses in this franchise a most valuable piece of property over and above what they may have actually laid out in the cost of construction, and they have, therefore, something upon which they can raise money outside of the sum they get through the city's guarantee. But beyond this, if the company can get permission to put \$200,000 or so of additional first mortgage bonds on the property, they can easily make these as good as those guaranteed by the city, indeed better, as all they have to do is to allow the purchaser to deduct the interest for the ten years at three per cent. per annum from the face value of the bonds, and he is at once put on really a better footing than those holding the bonds with the city's guarantee. Nor do the company lose anything as it is merely paying the interest in advance, and not selling the bonds at a discount.

Having now shown that the company have no right to ask for more bonds than they claim these works will cost, we will briefly show where it would be a serious injury to the city's interests to allow them to increase the limit beyond \$280,000. By the agreement between the city and the company the latter is to construct these works for \$280,000, and the city is to receive one-eighth of the net profits. Now the city has no security for its share of the profits. The works are to be mortgaged to secure the bonds. If these bonds be for the sum of \$500,000 it is certain that the position which the city occupies is not as good as if the company had only \$280,000 of bonds on its property. The amount of the capital of the debt, and its consequent interest, is so much greater that risk of its being foreclosed by the bondholders is much more. But the great objection we have to the bonds being any more than the sum agreed on by the company as the cost of the works is, that if the company fail in carrying the project through, the city for its own interests will have to acquire the works, and it will then be of the utmost importance to it that the bonds are of a smaller rather than a larger amount. We must confess that the way in which the company has acted in their negotiations with the city, the reluctance they show in producing figures which there should be no objection to give, and now the extreme earnestness with which they insist upon being left entirely free to issue as many bonds as they can sell, make us believe that it is doubtful if they are able to carry through the enterprise at the figures they have named. If they want the right to issue this additional amount of bonds for a bonus for themselves, the city cannot allow it. If they require it to build the New Westminster Works, the city will desire that they raise the money by a separate issue of bonds. If they propose to use it for the additional distribution works the city will reply that the proposition was to give an efficient service for \$280,000, that the distribution system was cut down at the company's own request, and that it is for it now to arrange to provide the funds for that extension without burdening further that part of the waterworks included in the agreement with the city.

And if the council are unable to limit the bonds the people can do so at the polls by rejecting the scheme.

CORRESPONDENCE.

The Water Works Question.

To the Editor of the NEWS-ADVERTISER:

SIR,—In your editorial of Tuesday, April 26th, referring to the agreement between the Coquitlam company and the Corporation, you express the opinion that the whole issue of bonds by the company should not exceed the amount on which the city guarantees interest, viz; \$280,000; and that, "Provided, therefore, the revised agreement be actually framed as we now understand it, we consider that it may be put before the voters as a contract fair to both parties."

In your issue of to-day, in which you publish the revised agreement as it passed the Council and according to which the issue of bonds is not limited to \$280,000, you think that the people should, in the interests of the city, insist in having that proviso inserted. The view taken by the company is that as the city guarantees a fixed rate of interest on a stated amount of bonds it cannot be made liable for any greater amount than that stated. However, in order to obtain professional opinion on the subject, I submitted the question at issue to the agent of the Bank of British Columbia in this city, and I have his permission to state that in his opinion the only effect the limitation might have would be to hamper the company in its financial negotiations, and that the agreement as it now stands, as regards the point in question, would not injuriously affect the city's interests. From his training and experience in financial matters, the opinion of the agent should be entitled to consideration, more especially as the bank above referred to is directly concerned in anything that would affect the city's credit.

Taking all things into consideration I do not think the unprejudiced public would wish to have a restriction inserted into the agreement which would be of no benefit to the city but might be injurious to the company's interests.

Yours truly,

E. A. WILMOT.

Vancouver, April 30th, 1887.

To the Editor of the NEWS-ADVERTISER.

I have read with pleasure the able articles which have appeared in your late issues in regard to the agreement about to be entered into by the city with the Coquitlam Waterworks Co.

In common with very many others I entirely agree with you in suggesting that the limit of first mortgage bonds issued by the company should be the amount of their estimated cost of the work, viz., \$280,000. The Company claim that these works can be properly constructed for this amount, and to prove it to the satisfaction of the ratepayers they have submitted the details of their estimate to Mr. Schussler, C. E., of San Francisco, for verification; of course in his estimate we must conclude that the company have made, as is usual in all engineer's estimates, due allowance for accidents and contingencies. This being the case the Company can have no valid reason for issuing bonds for a larger sum than \$280,000, and it would certainly be much better for the city to be connected with a Company whose liabilities did not exceed the above amount than to be connected with a Company who have the option of issuing an indefinite amount of bonds regardless of the works.

I am also of opinion that it would be very much more satisfactory to the ratepayers were the city to insist on the Company, (who in this matter have nothing to lose and everything to gain) giving some security for their good faith before the by-law is placed before the people. As the matter now stands they are at perfect liberty to repudiate the whole agreement, leaving the city to pay all the costs of submitting the by-law to the electors.

Very truly yours,

CITIZEN.

VANCOUVER, April 30th, 1887.

THE CITY SOLONS

Meet, Manage and Manipulate—
The Ordinary Routine—The
Waterworks Question.

Schussler's "Yes" or "No"
Awaited—Hard Pan Hard
to Hit in the Coquitlam
Agreement.

The regular weekly meeting of the city council was held last night. Present—Ald. Lefevre, Oppenheimer, Mannion, Hamilton, Sanders, Lockerby, Clark and Humphries.

His Worship Mayor McLean in the chair.

The minutes of the last meeting were read and approved.

COMMUNICATIONS.

The following telegram was read:

"SAN FRANCISCO,
"April 28.

"T. F. McGUIGAN,

"City Clerk, City of Vancouver.

"Mailed reports to-day, Council to determine my fee.

"H. SCHUSSLER."

Laid over.

The agreement between the Coquitlam Water Co. and the City Council was handed in by Mr. Wilmot.

The city solicitor read the agreement clause by clause.

The words "in such manner as the company may require" was erased.

Ald. Hamilton said the enacting clause did not coincide with the preamble. It would prevent the company from issuing \$280,000 altogether in bonds and stocks.

Ald. Mannion said the agreement should be referred to legal gentlemen for advice.

Ald. Lefevre said they had had enough advice from legal gentlemen.

It was then decided to set the agreement aside until the engineers' report should be received.

Moved by Ald. Lefevre, seconded by Ald. Oppenheimer, that the city solicitor be instructed to insert the following clause into the agreement between the company and this council:

"The company of the first part agree to give to the corporation of the second part a first mortgage upon their works for \$280,000 bearing interest at the rate of 3 per cent. per annum to be held in trust for the first mortgage bondholders."

Ald. Humphries said it appeared that there might be a second or even a third mortgage. He did not see why the city should not build waterworks without the help of the company. Vancouver would have to pay the piper.

(1887) (45)

TUESDAY MORNING, MAY 3.

A CORRECTION.

In our issue of Sunday we published a letter from Mr. Wilmot, of the Coquitlam Water Works Company, in which he referred to the position taken by the NEWS-ADVERTISER on the limitation to be imposed on his company in the issue of bonds. In that letter he stated that he had seen the agent of the Bank of British Columbia in this city, and his opinion was that such limitation would only hamper the company, and that the agreement as it now stands would not injuriously effect the city's interest. But from an interview with Mr. Keith, the gentleman in question, it appears that Mr. Wilmot, no doubt unwittingly, has quite mistaken his views. What Mr. Keith did say was that if the city's interests were protected by the \$280,000 being secured by a *first mortgage* to be held by the city in trust for the bond holders, it did not appear to him that it would injuriously effect the city's interest if the company issued further bonds. These further bonds would in that case necessarily be mortgage bonds *junior* to the bonds for the \$280,000, which latter would be the *only first mortgage* bonds. As this opinion of Mr. Keith's is an entire endorsement of the course which the NEWS-ADVERTISER has insisted on from the commencement, namely, that the *first mortgage bonds must be limited* to the amount of \$280,000, it requires no comment.

At the regular meeting of the city council last night the agreement with the Coquitlam Waterworks Co. was brought up. The company, by its representative, handed in the agreement as engrossed by the city solicitor, and signed by the company. As we understand it the agreement was passed by the council last week, and we think the company had a right to expect that it would not be the subject of any more discussion, for in this whole matter, although obliged to oppose the way in which the company desire to issue their bonds, we desire to act fairly to them. However the agreement came up and upon its being read it was found in clause 3 the city solicitor had not followed the wording as carried by the council last week, but that the words "in such manner as the company may require" had not been struck out. This was now done and the clause now stands as before ordered.

We are glad to see that the city council is now becoming alive to the importance of limiting the amount of first mortgage bonds which the Coquitlam Waterworks Company shall issue to the amount which the city may be called upon to guarantee. Ald. Lefevre introduced a motion to that effect last night which was put over till next week. We should like to see that resolution carried, but if the company think it would interfere with their financial arrangements we consider that if the third clause be amended by inserting the words "first mortgage" before the word "bonds," and at the end of the words "the whole amount of such first mortgage bonds which the said company may issue being limited to the amount of \$280,000." We think that the council should lose no time in settling this question now. We hope that the company will see that this is the only possible way in which they can hope to carry their proposition, and it will be certainly more graceful for them to agree to this condition now, than to wait and only accept it when the vote of the people decides against them.

The city clerk reported last night that he had a telegram from Mr. Schussler saying he has forwarded a report. We suppose it will therefore be here this week. Whether favorable or adverse to the proposition of the Coquitlam Company, we do not see that any importance can be attached to it by anyone till we know what were the details forwarded to him and upon which he must of course have based his report. We have already expressed our opinion upon the extraordinary plan adopted by the company, an interested party, sending some of the necessary data direct to the referee. We think that before the company get through they will be of the opinion that a less mysterious and more business like course would have after all been better for their own interests.

We understand that the report from Mr. Schussler on the Coquitlam Waterworks Company's scheme has been received from San Francisco. Also, that it is favourable as to the possibility of executing the works at the figures estimated by the company. Until, however, we know what information was sent to Mr. Schussler as to the scheme it is of course impossible to know whether his report is really conclusive or not.

We presume the council will set an early day for a meeting to receive the report, as if time was of importance two months ago it certainly must be much more so now.

Ald. Mannion said the company might make as many mortgages as they liked if any one would take them.

Ald. Lefevre said the object of his motion was to protect the city and strengthen the company. It would insure confidence and make the city's position secure, and he would further say that if Ald. Humphries opposed the motion he had not the city's interests at heart.

Ald. Humphries said that there was something he could not understand in the matter, and the sooner the city got rid of the company the better. There was one thing that made him suspicious, there had been three propositions handed in, a great difference existed between the first and third.

Ald. Hamilton said the motion would not be in harmony with the rest of the agreement. It might involve the city. The company might become defunct and get swap judgment and buy it in again for \$100,000. This would make the city \$180,000 out of pocket. As the agreement stands the company would violate it if they issued over \$280,000 worth of bonds.

Ald. Lefevre contended that the agreement did not prevent the company from issuing an unlimited amount.

Ald. Humphries said it was easy to settle the matter; let the companies measure swords and go it alone.

Ald. Lefevre: The water might mingle, and it don't do to mix drinks, you know.

Ald. Humphries thought it best to pass everything and let it go before the people for approval, that would settle it.

Ald. Lefevre was willing to let his motion lie over until the next meeting.

It was then agreed that the Mayor should be asked to call a public meeting on Thursday night at 8 o'clock to decide in what manner the city should celebrate Her Majesty's year of Jubilee.

The council then adjourned.

May 6

We think no one will charge us with any exaggeration when we say that during the past few days it has become clear that if the agreement with the Coquitlam Water Works Company is to be approved of by the voters, it must be amended so that the limitation of the company's power to issue first mortgage bonds to the amount which the city is called upon to guarantee shall be clearly set out.

We think therefore that the council at their special meeting to-morrow will insist upon this, and then if the company agree to it, as we trust they will, lose no more time but have the matter at once put before the people.

SPECIAL MEETING

Of the City Fathers Yesterday
to Consider Engineer Schussler's Report on the

Coquitlam Water Works Scheme.

His Report in Extenso, with
the Company's Amended Agreement.

A special meeting of the city council was held yesterday afternoon at 3 o'clock to take into consideration Mr. Schussler's report on the feasibility of the Coquitlam scheme, and the expense of construction; also to reopen the recreation park scheme and consider the offers from other parties. Present: Ald. Lefevre, Oppenheimer, Alexander, Lockerby, Sanders, Humphries, Hamilton.

His Worship Mayor McLean in the chair.

The city clerk read the following report sent by Mr. Schussler.

REPORT.

To His Worship the Mayor and the Hon. City Council of Vancouver.

DEAR SIRS,—Through your city clerk, Mr. Thomas D. McGuigan, I have received various papers relating to a proposed water supply from Lake Coquitlam.

You ask me to report to you on the nature and desirability of the material proposed, whether the pipes are adequate for the service proposed and an estimate of cost of construction.

As I wired to Mr. McGuigan, about a week ago, I am excessively busy carrying on a large number of engineering works, not only in or near this city but also in various parts of the state, so that it is impossible for me to go into great detail in regard to the proposed scheme.

But as your honorable body have done me the honor to consult with me, I take pleasure in going into some of the salient points of your proposition, hoping that you will pardon the briefness of my letter.

I must also state that I this morning received (probably from your council) a package of papers supposed to contain estimates of proposed Coquitlam Waterworks.

I return you this package unopened principally for want of time for close examination, and, also, as I can thus give you my entirely independent ideas, etc., on your scheme.

Your proposed pipe is about 20 miles in length.

The elevation of the pipe inlet is 435 feet above tide, the maximum distributing level is, say 60 lbs. per square inch at an elevation of, say above tide or Vancouver, the outlet therefore would be 100 feet by 138 feet, or 238 feet above tide.

This gives, practically, say 200 feet fall to be distributed over the entire 20 miles, or 10 feet fall per mile.

You want to deliver in the neighborhood of 1,500 gallons per minute at this elevation.

In order to obtain about this capacity through a rivetted sheet-iron or sheet-steel

pipe, I advise the construction of a continuous pipe of an interior diameter inside of the small course of 16 inches.

The pipe to be all made of No. 12 iron (heavy) or soft steel, weighing 4.40 lbs per square foot.

Having had a great deal of experience in the construction of sheet and plate-iron pipes up to diameter of 44 inches and to pressures of 1,800 feet, I have ceased to use during the last 10 years all numbers lighter than No. 12.

This number makes a splendid light joint, particularly as it admits of dipping and caulking at the laps and splitting and caulking in the seams, while a lighter number is not desirable for this purpose.

My advice is to make this pipe in lengths of say seven courses, there being a large course at each end of each length.

A nipple say 6 inches long being rivetted say for 3 inches into one end of each length of pipe, say 8 rivets.

This nipple projects 3 inches out of this length and enters the big course of the next pipe.

A wrought-iron welded band $4\frac{1}{2}$ inches wide of $\frac{1}{4}$ -inch iron, having 5-16-inch play between the inside of the band and the outside of the big course all around forms a lead joint over the point where the two pipes butt together.

Diagram in Original.

This joint is not expensive, is very substantial, permits of considerable curving of the pipe in the joints, and gives great satisfaction.

I have used it at the Sandwich Islands on pipes 41 inches in diameter bearing over 300 feet of pressure, and being in operation there for 8 years.

A pipe 16 inches interior diameter inside of small course and with fall of ten feet per mile produces a mean velocity of 30 inches per second, delivering 6,000 cubic inches per second, or nearly 1,500 gallons per minute, or a daily capacity of about $2\frac{1}{2}$ million gallons.

Allowing for lap.

No. Iron.	Weight p. sq. ft.	Thickness in inches.	Size of pipe sheet.	Size of small sheet.
12	4.40 lbs	0.11 in.	53 11-16 by 42 in.	53x42 in.

Area of large course, . . . 15.66 square feet.
Weight " . . . 63.9 lbs exclusive of rivets.

Area of small course . . . 15.46 square feet.
Weight " . . . 68 lbs. exclusive of rivets.

Each length consisting of three small and four large courses, having a net length (allowing for the lap of six round seams) of 24.16 feet and a total weight of sheet-iron (exclusive of rivets) of 479.6 lbs. per length, we have an average weight of sheet-iron exclusive of rivets, bolts and supplies of 19.85 lbs. per lineal foot.

The total length of the pipe being 20 miles, or, say 103,680 lineal feet, you would require about 105,600 by 19.85, or 2,096,160 lbs of sheet-iron No. 12, or sheet-steel.

The weight of rivets, being single in round seams, and double in straight seams, will amount to about 1.30 of the weight of above sheet-iron; provided seams are proportioned as hereafter advised.

The total weight of the rivets would therefore be in the neighborhood of 70,000 lbs.

The rivets should have the following

512-8-2

A special meeting of the council will be held this afternoon at 3 o'clock to arrange the waterworks agreement and receive the report of Mr. Schussler, C. E., on the Coquitlam scheme. It is also expected that the recreation park scheme adopted by the council will be reopened and a number of other affairs discussed.

The city council at their special meeting yesterday afternoon received the report of Mr. Schussler, the engineer of San Francisco, to whom the plans of the Coquitlam Waterworks Co. had been submitted. The report will be found in extenso in the proceedings of the council. Mr. Schussler reports that upon the plans laid before him the works can be completed within the estimates of the company. We had understood from the negotiations of the company with the council that they intended to lay a steel pipe, but we see that Mr. Schussler speaks of an iron pipe, and has apparently based his calculations upon that material.

The company laid before the council an amended agreement, of which a copy will be found in the report of their proceedings in another column. In this they agree that the amount of first mortgage bonds which they shall issue shall not exceed the sum of \$280,000, being the amount for which they ask the city's guarantee of 3 per cent interest.

This action on the part of the company removes the objection which we have always expressed to the contract between the city and the company, and we are glad that the company have followed our suggestion and agreed to this change. We presume that the council will on Monday night accept the agreement and issue the by-law.

	Size of body	Size of head	Approximate No. per lb.
Seam Rivet	5-16x3/4	5/8x5-32	50
Lapp "	5-16x3/4	5/8x5-32	43

PROPORTION OF SEAMS.				
Diameter of Rivet.	Centre to centre, dis. in each row of double straight seam inch.	Dis. centre to centre, between two rows of straight seam inch.	Dis. centre to centre in round single seam.	Dis. centre of seam to edge of plate.
5-16in.	1.33	11-16in.	1,1-16in.	11-16in.

Iron to have a tensile strength of not less than 50,000 lbs. per square inch, and its elastic limit not falling below 22,000 lbs. per square inch.

Rivetting to be done in thorough workmanlike manner; edge of shut where at the lap it falls between two thicknesses of iron to be scraped down to a fine edge, and a rivet to be driven through this edge so as to insure perfect tightness.

Lapp rivets to be used where three thicknesses come together.

Edges of sheets for 3 inches from the lapps being chipped and caniked and balance of all seams being split and caulked.

Pipe, when finished, in above lengths of 24 feet 2 inches, to be dipped in a bath of hot asphaltum and tar, so mixed and boiled that all volatile oils are expelled, and that the coating does not become brittle when exposed to cold or become soft when exposed to sun.

Before pipes are entered asphaltum to be scraped off at ends outside where lead joint is to cover the same.

Pipe to be repainted and touched up with same asphaltum paint wherever chipped or during transportation.

Pipe to be buried in ditch of sufficient depth to keep frost away, and earth thoroughly packed and rammed around it.

No part of pipe to rest on sharp, rocky points; but when ditch is rocky a bed of earth to be spread over same before laying pipe.

Every high point on pipe line to be mounted with a self acting air cock or vacuum valve, and every depression to have a blow-off varying from to four inches diameter, according to size or length of the depression. Upper or inlet end of pipe to be provided with screen to prevent sticks, leaves or other objectionable things from getting into pipe.

If water is apt to become dirty at inlet, a large settling tank should be provided. If you desire to construct an intermediate reservoir at or near Port Moody it should be of an elevation equal to the gradient line, i.e., the line allowing say 10 feet per mile fall for every mile distant from inlet.

For instance; if this reservoir is located 10 miles from Lake Coquitlam inlet the surface level of this reservoir should be about 435 less 10x10, or 335 feet above tide.

I am not acquainted with the cost at Vancouver of sheet iron, or sheet steel, or of rivets, etc., but from my trip through Oregon I can form an approximate idea of the character of the country for ditching, hauling, road making, stumping, etc.

In the following estimate, which is based upon the number of pounds of iron in the sheets, required allowance is made

for rivets, mechanical work, bands, nipples, air cocks and blowoffs, asphaltum, coating, ditching, hauling, etc.

I assume price of iron at 35 cents, and rivets at 7 cents a pound, if it is more or less at your place you have to make allowance for following estimate:

Cost per pound of entire 16 inch pipe complete in the ground and ready for service

Iron per pound. 35 cts.
Rivets per pound. 7 cts.
Mechanical work of making, rivetting, etc., pipe, and making joints in ditch. . . 3 cts.
Coating, hauling, ditching, fitting, etc., as above. . . 2 cts.
Allowance for contingent expenses. 0.2 cts.

Total. 9 cts. per lb.

The total weight of sheet-iron being 2,096,160 pounds, at 9 cents complete, \$188,654.40 for 20 miles of first class 16 inch pipe of heavy No. 12 in the ground and ready for use, or \$9,432.72 per mile complete.

This estimate is very liberal and should easily construct the above work fit to last 50 years or more.

I do not know cost of cast-iron distributing pipe at Vancouver, but the cost per lineal foot of ditching, laying, lead, etc., filling, etc., complete for action, should not exceed 15 cents for 4 inch, 20 cents for 6 inch, 25 cents for 8 inch, 30 cents for 10 inch, and 35 cents for 12 inch.

This is outside of the cost of the pipe delivered at Vancouver.

From this you can easily estimate the cost of a cast-iron distributing system.

The above gives you my ideas and advice as to how you should construct the works and what their approximate cost will be, should you conclude to receive your water supply from Lake Coquitlam.

The suggestions, dimensions and estimates, are based upon 23 years of active experience in business of economical and practical water works construction, and I hope that my above letter will be of some service to your honorable body in your proposed enterprise.

I am, yours, respectfully,
H. SCHUSSLER,
Ch. Eng., S. V. W. W.,
316 California st., S. F.
San Francisco, April 27, 1887.

His Worship asked Mr. Wilmot, of the Coquitlam Co., to compare his figures with the estimate of Mr. Schussler.

Mr. Wilmot said the difference was \$87,000 for duty, distribution, commission, brokerage and interest to be added to Mr. Schussler's estimate of the cost.

Ald. Lefevre asked what was be done on the question.

His Worship said the council would take up the agreement between the company and the city.

The company submitted new clauses to take the place of clause 2 and clause 4, which, if accepted by the council, the following will be the agreement between the city and the company.

THIS AGREEMENT.

made the day of one thousand eight hundred and eighty-seven.

Between the Coquitlam Water Works Company, Limited, a body corporate, having its head office at the City of Vancouver in the Province of British Columbia, hereinafter called the company, of the first part, and the Corporation of the City of Vancouver hereinafter called the corporation of the second part.

Whereas, the said company by its acts of incorporation (being chapter 33 of the statutes of 1886) is empowered to take water from the Coquitlam Lake and lay pipes and do all things necessary for the purpose of bringing and distributing such water within the limits of the City of Vancouver.

And whereas, the said company has asked the said corporation to guarantee the payment of interest at the rate of three per centum per annum on the said Company's first mortgage bonds, for and during the period of ten years, it being understood and mutually agreed to by the parties hereto that the issue of such first mortgage bonds shall not exceed in amount \$280,000.

And whereas, the said corporation has agreed to furnish by by-law the said guarantee, so conditioned as to become effective from and after the time the said company shall have laid its main pipe from the Coquitlam Lake to Heatley Avenue, in said City of Vancouver, and shall have laid three miles of distributing pipes within said city, in consideration of the covenants, promises and agreements hereinafter made by the said company, and of the assignment of an interest equal to one-eighth of the total net profits received from that portion of its works within the City of Vancouver from said company to said corporation.

Now this Indenture witnesseth, that in consideration of the premises the said company, for itself, and its assigns, covenants, promises and agrees to and with the said corporation that the said company will construct, equip and maintain during the said period, in conformity with its act of incorporation, a thoroughly efficient system of water works for the supply of the City of Vancouver and its inhabitants with water from the Coquitlam Lake, and further covenants, promises and agrees to and with the said corporation to so construct and equip said water works system within one year after a by-law guaranteeing the payment of interest on the company's first mortgage bonds as aforesaid shall have been finally passed by said corporation and shall have become law, and thereafter to maintain a thoroughly efficient water service in and for the said city and its inhabitants in manner following, that is to say:

The said company shall from time to time and at all times after the lapse of one year from the final passing of said by-law, furnish for the protection of the City of Vancouver from fire a good and sufficient supply of water free of charge to the said corporation, and will place hydrants at any point along their line of pipes within the limits of the City of Vancouver required by the said corporation, said corporation paying to the said company the sum of fifteen dollars per annum for each and every hydrant so placed as aforesaid.

And the said company hereby, for itself and assigns, covenants and agrees with the said corporation that the said company shall and will provide, construct, equip and maintain such water works as will be capable of and shall maintain a pressure in the city as aforesaid, equal to sixty pounds per square inch at the height of one hundred feet above sea level while delivering fifteen hundred gallons of water per minute and the main shall be sixteen inches in diameter or of sufficient capacity to furnish the above discharge, but in any case shall not be less than fourteen inches in diameter.

And the said company hereby agrees that in consideration of the said corporation guaranteeing interest at the rate aforesaid on the bonds of the said company, as aforesaid, that it, the said company, will, by good and efficient assignment, transfer to said corporation an interest equal to one eighth of the total

net profits received from that portion of its water works within the City of Vancouver.

And the said company for itself and its assigns further covenants and agrees to and with the said corporation that the said corporation shall have a first lien on the receipts of the said company, over and above working expenses, up to the amount of the sum paid by the said corporation on said guarantee of interest as aforesaid, and any amount advanced by the said corporation for deficiency under the guarantee shall be repaid by the said company to the said corporation.

The phrase "working expenses" shall mean and include all expense of maintenance of the water works and of the belongings thereto, and of the stock and plant used in the working thereof, also all the rent, expenses of and incidental to operating the water works including stores and consumable articles, also rates, taxes, insurance and compensation for accidents or losses; also all salaries and wages of persons employed in and about the works and all office management and legal expenses.

And the said company, for itself and assigns, further agrees with the said corporation that the auditor or auditors from time to time appointed by the said corporation shall have free access at all reasonable times to the books of the said company, sub-section 89 of section 142 of the Vancouver Incorporation Act, 1886, and amendments thereof, as to appointment of the Mayor or an Alderman director of a company, the stock of which shall be guaranteed by the city, shall be deemed to be incorporated with and form part of this agreement during said period.

And the said company, for itself and its assigns, further covenants and agrees to and with the said corporation, that not later than one month after the said by-law guaranteeing the interest on the said bonds have been finally passed and become law, that the said company will furnish the said corporation with approved security to the extent of five per centum on the amount for which the guarantee of the said corporation is given, that it the said company will comply with all its covenants, provisions and agreements with the said corporation, as to the completion of said works, said security to be forfeited to the said corporation in case of failure on the part of the said company to perform and fulfill its covenants, promises and agreements otherwise to be returned to said company.

And it is hereby further covenanted, and agreed, by the said company that they shall not employ any Chinamen or person of the Chinese race in or about the construction, maintenance or equipment of their said water works system to the City of Vancouver or within the limits of said city.

Ald. Lefevre moved that the city solicitor be instructed to insert a clause to the effect that the company be limited to an issue of \$280,000 first mortgage bonds bearing interest at the rate of 3 per cent. Seconded by Ald. Lockery. Carried.

The city solicitor was then instructed to have the revised agreement engrossed, and all the papers in connection with the waterworks prepared and ready for the council on Monday night.

It was then decided to allow the new recreation park scheme to stand over until Monday night, after which the meeting adjourned.

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CONSCRIPT FATHERS

Meet and Forge the Bonds of
Union Between the City
and Coquitlam.

The Mayor Says the Press is
Worked by a Crank, and
He is Right.

He Wrestles With the Alder-
men and Gets a Fall---
Disfigured, but Still
in the Ring.

The regular weekly meeting of the city council was held last night at the usual hour. The attendance of citizens was rather smaller than usual, although the all absorbing question of the day was before the council. Present—Ald. Lefevre, Oppenheimer, Sanders, Hamilton, Lock-erby, Mannion and Humphries.

His Worship Mayor McLean in the chair.

The minutes of last meeting were read and approved.

The water by-law No. 36 was then read a first time.

The by-law was then read a second time clause by clause, and passed in committee on the whole. Ald. Hamilton in the chair.

The agreement was then read clause by clause and passed.

The committee then rose and reported progress.

His Worship took the chair,

Ald. Hamilton moved, seconded by Ald. Lefevre, that the Coquitlam Company deposit a bond of \$400 with the city treasurer to cover the amount to be expended on Mr. Schussler, in case the company fails to deposit the necessary bonds within the time specified. Carried.

The by-law No. 37, appointing polling places and returning officers was read a first time and passed.

The Council went into committee on the whole, Ald. Lefevre in the chair, and passed the by-law clause by clause a second time.

The Committee rose and the by-law was read a third time and passed.

The council then adjourned.

The Council last night passed the by-law which is necessary to enable the city to guarantee the three per cent. interest on the \$280,000 of bonds to the Coquitlam Waterworks Company. It is to be voted on by the people on the 4th June next. It will be a relief to most people to see this matter disposed of by the council. The part which the NEWS-ADVERTISER has taken in the matter will not be forgotten by the citizens, and as regards the form in which the agreement with the company is made we think the city's interests are properly protected.

As to the general plan of the proposed scheme, the engineering details and the material of which the pipe is to be constructed; we have been careful as yet to express no opinion. These are matters requiring careful examination, technical knowledge, and the expenditure of considerable time in going through the estimates of the company and also the report of Mr. Schussler. There has already been a great deal of criticism passed and many hasty opinions expressed against the scheme by persons who could not possibly have had either the opportunity to get the data necessary or the knowledge to understand them even if they possessed the required information. This is to be deprecated. We believe the majority of our citizens desire that some satisfactory waterworks scheme should be inaugurated as speedily as possible. If the Coquitlam Company can furnish same by their scheme, the people will probably endorse it by their votes. If, however, it should on a close examination not seem to be satisfactory, it will doubtless be voted down.

The three weeks which intervene between now and the day of the election will give ample time for this examination and our columns will be open for a full and complete discussion of a subject which is of so much importance to our people.

(1887)

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BY-LAW No. 36.

A Bylaw to guarantee the payment of interest on the bonds of the Coquitlam Waterworks Company (Limited) by the Corporation of the City of Vancouver.

WHEREAS it is desirable that the City of Vancouver accept the proposition of the Coquitlam Waterworks Company (Limited) as contained in the agreement hereto annexed for the purpose of supplying the city with water.

AND WHEREAS the Coquitlam Waterworks Company (Limited) have undertaken on the terms and conditions set forth in the said agreement, to supply the said city with water.

AND WHEREAS the said city, in consideration of the terms and conditions in the said agreement contained, have agreed to furnish by by-law to the said company a guarantee for the payment of interest on the first mortgage bonds of the said company to an amount not exceeding two hundred and eighty thousand (280,000) dollars. The issue of which said first mortgage bonds is limited under the said agreement to that amount at the rate of three per centum per annum for the period of ten years, so conditioned as to become effective from and after the time the said company shall have laid its main pipe from the Coquitlam Lake to Heatley avenue in the said City of Vancouver, and shall have laid three (3) miles of distributing pipe therein.

AND WHEREAS the sum of eight thousand four hundred (8,400) dollars will be required to be raised, if necessary, as a special rate for paying the said interest at the days and times when the same becomes payable if in any year during the said term of ten years the said company is unable to pay the said interest on its issue of first mortgage bonds as aforesaid.

AND WHEREAS the amount of the whole rateable property in the City of Vancouver, according to the latest revised assessment roll, is two million seven hundred and thirty-eight thousand eight hundred and six dollars.

AND WHEREAS the total amount of the existing debt of the City of Vancouver is one hundred and seventy-one thousand dollars (\$171,000).

Therefore, the Mayor and Alderman of the City of Vancouver in council assembled enact as follows:

1. That the Corporation of the City of Vancouver hereby guarantees to the holders of the first mortgage bonds of the Coquitlam Water Works Company, (limited), to an amount not exceeding two hundred and eighty thousand (280,000) dollars, the payment of interest on said bonds to said amount, at the rate of three per centum per annum, payable semi-annually, for the ten years following the time when said company shall have its main pipe laid from Coquitlam Lake to Heatley avenue within the City of Vancouver, and shall have three (3) miles of distributing pipes laid therein.

2. That the Mayor and Treasurer of the City of Vancouver shall respectively sign and countersign said bonds and affix the Corporate Seal of the City thereto, and shall also sign and countersign the interest coupons attached to said bonds to the number of ten on each bond, or sufficient in number of said coupons to cover the period of said guarantee, the coupons so signed by said Mayor, and countersigned by the Treasurer, to be the coupons which shall be consecutively payable in each year during the co-terminance in force of said guarantee, and the bonds of said company shall have written or printed across the face of each of such bonds a statement that the signatures of the said mayor and treasurer are affixed to such bond for the purpose of guaranteeing the payment of interest on said bond at the rate of three per centum per annum for the ten years next succeeding the coming in force as aforesaid of this guarantee, but the signature of said mayor and treasurer to any of said bonds or coupons shall not bind this Corporation in any way until after this guarantee shall have come into force as aforesaid, due notice of which coming into force shall be given by the City Clerk to said Bank of British Columbia.

3. That if required in each year during the existence of said guarantee there shall be levied in addition to all other rates of every kind, a special rate sufficient

to raise upon the whole rateable property of the city according to the last revised assessment roll in such year the sum of eight thousand four hundred (8,400) dollars, or such less sum as may be required under said guarantee.

4. That on or before the first day of May in each and every year, after this guarantee shall come into force, the auditor of the said city shall notify the treasurer of the said Corporation of the City of Vancouver of the amount of money required to be paid under this guarantee, when a rate sufficient to raise the amount required shall be levied by the said Corporation as aforesaid, and the amount so levied shall be paid semi-annually on account of said interest so guaranteed at the Bank of British Columbia in the City of Vancouver, or at the Bank of British Columbia in the City of London, England, as may be designated upon the said bonds, on or before the first day of June and December in each year, and the interest coupons detached from said bonds to the extent of the amount so paid by the Corporation of the City of Vancouver shall be received and retained by said Corporation until the amount so paid shall be refunded to it by said Company.

5. This by-law shall, before the final passing thereof, receive the assent of the electors of the said Corporation in the manner provided by the Vancouver Incorporation Act, 1886, and the Vancouver Incorporation Act, 1886, Amendment Act, and shall take effect on the twentieth day of June, 1887.

M. A. MACLEAN, Mayor.
THOS. F. MCGUIGAN, City Clerk.

THIS AGREEMENT.

made the second day of May in the year of our Lord one thousand eight hundred and eighty-seven.

Between the Coquitlam Water Works Company, Limited, a body corporate, having its head office at the City of Vancouver in the Province of British Columbia, hereinafter called the company, of the first part, and the Corporation of the City of Vancouver hereinafter called the corporation of the second part.

Whereas, the said company by its acts of incorporation (being chapter 33 of the statutes of 1886) is empowered to take water from the Coquitlam Lake and lay pipes and do all things necessary for the purpose of bringing and distributing such water within the limits of the City of Vancouver.

And whereas, the said company has asked the said corporation to guarantee the payment of interest at the rate of three per centum per annum on the said Company's first mortgage bonds, for and during the period of ten years, it being understood and mutually agreed to by the parties hereto that the issue of such first mortgage bonds shall not exceed in amount the sum of \$280,000.

And whereas, the said corporation has agreed to furnish by by-law the said guarantee, so conditioned as to become effective from and after the time the said company shall have laid its main pipe from the Coquitlam Lake to Heatley Avenue, in said City of Vancouver, and shall have laid three miles of distributing pipes within the said city, in consideration of the covenants, promises and agreements hereinafter made by the said company, and of the assignment of an interest equal to one-eighth of the total net profits received from that portion of its works within the City of Vancouver from said company to said corporation.

Now this Indenture witnesseth, that in consideration of the premises the said company, for itself, and its assigns, covenants, promises and agrees to and with the said corporation that the said company will construct, equip and maintain in conformity with its act of incorporation, a thoroughly efficient system of water works for the supply of the City of Vancouver and its inhabitants with water from the Coquitlam Lake, and further covenants, promises and agrees to and with the said corporation to so construct and equip said water works system within one year after a by-law guaranteeing the payment of interest on the company's first mortgage bonds as aforesaid shall have been finally passed by said corporation and shall have become law, and thereafter to maintain a thoroughly efficient water service in and for the said city in manner following, that is to say:

The said company shall from time to time and at all times after the lapse of one year from the final passing of said by-law, furnish for the protection of the City of Vancouver from fire a good and sufficient supply of water free of charge to the said corporation, and will place hydrants at any point along their line of pipes within the limits of the City of Vancouver required by the said corporation, said corporation paying to the said company the sum of fifteen dollars per annum for each and every hydrant so placed as aforesaid.

And the said company hereby, for itself and assigns, covenants and agrees with the said corporation that the said company shall and will provide, construct, equip and maintain such water works as will be capable of and shall maintain a pressure in the city as aforesaid, equal to sixty pounds per square inch at the height of one hundred feet above sea level while delivering fifteen hundred gallons of water per minute and the main shall be sixteen inches in diameter or of sufficient capacity to furnish the above discharge, but in any case shall not be less than fourteen inches in diameter.

And the said company hereby agrees that in consideration of the said corporation guaranteeing interest at the rate aforesaid on the bonds of the said company, as aforesaid, that it, the said company, will, by good and efficient assignment, transfer to said corporation an interest equal to one eighth of the total net profits received from that portion of its water works within the City of Vancouver.

And the said company for itself and its assigns further covenants and agrees to and with the said corporation that the said corporation shall have a first lien on the receipts of the said company, over and above working expenses, up to the amount of the sum paid by the said corporation on said guarantee of interest as aforesaid, and any amount advanced by the said corporation for deficiency under the guarantee shall be repaid by the said company to the said corporation.

The phrase "working expenses" shall mean and include all expense of maintenance of the water works and of the belongings thereto, and of the stock and plant used in the working thereof, also all the rent, expenses of and incidental to operating the water works including stores and consumable articles, also rates, taxes, insurance and compensation for accidents or losses; also all salaries and wages of persons employed in and about the works and all office management and legal expenses.

And the said company, for itself and assigns, further agrees with the said corporation that the auditor or auditors from time to time appointed by the said corporation shall have free access at all reasonable times to the books of the said company, and sub-section 89 of section 142 of the Vancouver Incorporation Act, 1886, and amendments thereof, as to appointment of the Mayor or an Alderman director of a company, the stock of which shall be guaranteed by the city, shall be deemed to be incorporated with and form part of this agreement during said period.

And the said company, for itself and its assigns, further covenants and agrees to and with the said corporation, that not later than one month after the said by-law guaranteeing the interest on the said bonds have been finally passed and become law, that the said company will furnish the said corporation with approved security to the extent of five per centum on the amount of which the guarantee of the said corporation is given, that it the said company will comply with all its covenants, provisions and agreements with said corporation, as to the completion of said works, said security to be forfeited to the said corporation in case of failure on the part of the said company to perform and fulfill its covenants, promises and agreements, otherwise to be returned to said company.

And it is hereby further covenanted and agreed by the said company that they shall not employ any Chinamen or person of the Chinese race in or about the construction, maintenance or equipment of their said water works system to the City of Vancouver or within the limits of said city.

E. A. WILSON, President.

A. J. McCOLL, Secretary.

Signed, sealed and passed under common seal of the said company in presence of
A. E. HILL

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"FIRE SERVICE" ON ELEVATORS-- SOME STIFF POINTS.

To the Editor of the News-Advertiser:

SIR,—In his argument between the city and the Coquitlam Waterworks Company as read in the last meeting of the council, I observe that the company agree to maintain "such waterworks as will be capable of and shall maintain a pressure in the city equal to sixty (60) pounds per square inch at the height of one hundred (100) feet above the level, while delivering fifteen hundred (1,500) gallons of water per minute."

I am curious to know why a height of one hundred feet above sea level was chosen, when it can readily be proved that a very considerable area of the city is on a very much higher level. I am of opinion that most waterworks systems are planned with a view of rendering "a thoroughly efficient" fire and water service for the highest elevations. I happen to know that the following elevations inside the city limits, and of property which will be of great value in the near future, are correct, viz.:—

All property contained in the following block average an elevation of 170 to 200 feet above sea level. viz.: All lots in lot 302; all blocks in lot 301; and blocks 123 to 134; blocks 156 and 157; blocks 173, 174, 175, all contained in lot 264a; also a large but unknown area in the C. P. R. grant south of False Creek.

In block 185 the average elevation of the following blocks is 140 to 155 feet above sea level, viz.: Blocks 7, 8, 9, 10, 21, 22, 23, 24, 25, 34, 35, 36, 37, 38, 48, 49 and 50.

In the reserve northwest of lot 185 the higher part of which must eventually be covered by handsome residences, an area of 140 acres is from 150 to 180 feet above sea level.

From these elevations it is evident that the elevation chosen by the company as the limit of their effective fire service is too low by from 40 to 100 feet.

Assuming the average level of these properties to be 170 feet above high water mark, and the height of the highest building to be 40 feet, for an effective fire service the hoses used must be capable of throwing a stream at least 40 feet over the highest building. Adding these quantities together we find 250 feet as the minimum height of a water jet for an efficient fire service in Vancouver.

Now the pressure guaranteed by the company at one hundred feet above sea level is sixty pounds per square inch, which will be sufficient to throw a one inch nozzle a height of 108 feet, and no more. When in actual use a hose cannot play vertically on the roof of a burning building, but at the best at an angle of 70 degrees. This vertical height therefore becomes reduced to a height of 90 feet and no more.

From this statement it is evident that the roof of no building in Vancouver can exceed 100 feet above sea level. But it has been shown that houses will be built that require water jets reaching 250 feet above sea level.

I fancy this is a subject that will be of considerable interest to property holders and insurance companies. The latter will most certainly enquire into it.

In conclusion I would beg to state the elevations given in this communication are bona fide and cannot be disputed.

Your obedient servant,

FIRE SERVICE.

VANCOUVER, May 10th, 1887.

ONE paragraph in the report of the proceedings of the Council last night may be somewhat misunderstood. It is with reference to the bond that the Coquitlam Water Works Co. have to give \$400. This it is intended shall be a cash deposit made to protect the corporation against the expense incurred in holding a special election, and the fee payable to Mr. Schussler for his services, in case the Coquitlam Company should not after all proceed to carry out the contract.

JUDGING from our correspondence during the past few issues the water works question is likely to become very warm before the by-law has been finally voted upon.

COMMUNICATION.

A Letter from Mr. Arthur Hill, C. E.

To the Editor of the News-Advertiser.

SIR—I notice in your issue of this morning over the non de plume of "Fire Service" a letter containing the following extraordinary statements:—

"How the pressure guaranteed by the company at one hundred feet above sea level is sixty pounds per square inch which will be sufficient to throw a one inch nozzle a height of 108 feet and no more."

A little further on he says, "From this statement it is evident that the roof of no building in Vancouver can exceed 100 feet above sea level."

Without desiring to cavil at the absurdity of throwing a nozzle 108 feet (I presume he means a "jet") I have only to say that "Fire Service's" statement which I have quoted, and the conclusion based upon it are utterly reckless and absurd, and could only have been written in total ignorance of the subject treated of or with a deliberate intention of misrepresenting.

If the writer will repeat his statements over his signature I will undertake to refute them over mine.

I am, etc.,

ARTHUR HILL.

VANCOUVER, May 11th, 1887.

A Correction.

To the Editor of the News-Advertiser:

SIR,—Kindly correct a typographical error which occurs in your print of "Fire Service's" letter. In the third paragraph from the end your print reads "that the roof of no building in Vancouver can exceed one hundred (100) feet above the level." The original manuscript forwarded you reads, "one hundred and ninety (190) feet above sea level."

It is evident from the text preceding this paragraph that one hundred and ninety (190) feet is meant, but unless a correction is made the typographical error may be seized upon for columns of argument by some fiery supporter of the "inefficient" service now awaiting the people's vote. Very truly yours,

FIRE SERVICE.

May 11th, 1887.

To the Editor of the News-Advertiser.

SIR,—In looking over the agreement with the Coquitlam Water Works Co. I fail to discern any time limit within which the company had to begin their work—in other words, they appear to have tied the water question for two years, (during which to sell their bonds), by promising to make a deposit of five per cent.

CITIZEN.

CORRESPONDENCE.

The Voice of the People as Echoed Through the Medium of the Press.

Letters Relating to Leading Topics—The Water Works and School Question.

An Answer to "Fire Service."

To the Editor of the News-Advertiser.

DEAR SIR.—In your issue of to-day you publish a letter signed "Fire Service" in which the writer desires information respecting the efficiency of the fire service as proposed to be established by the Coquitlam Waterworks Company, and in which he leaves it to be inferred that the service would not be efficient at the highest levels of the city. His desire for information on this subject is quite natural, as it is evident that he possesses but little knowledge of the principle of hydraulics.

As "Fire Service" quotes, the company agrees to furnish "such waterworks as will be capable of and will maintain a pressure in the city equal to sixty (60) pounds per square inch at a height of one hundred (100) feet above sea level while delivering fifteen hundred (1,500) gallons of water per minute."

According to "Fire Service's" manipulation of figures he finds that two hundred and fifty (250) feet is the minimum height of a water jet for an efficient fire service in Vancouver." We presume he means two hundred and fifty feet above sea level.

"Fire Service" seems to be ignorant of the fact that if water is required to be delivered under pressure of sixty (60) pounds per square inch at say two hundred (200) feet above sea level, which, according to his statement, is the elevation of the highest ground in the city. That result can be obtained, but a less quantity would be delivered per minute than at one hundred (100) feet above sea level under similar pressure.

For instance, if we take the data, or basis of calculation, the same as that specified in the agreement, the works works will be of such efficiency as will maintain a pressure of sixty pounds per square inch at two hundred (200) feet above sea level, while keeping five hose streams running, each delivering 150 gal. per minute, and throwing a stream over 100 feet high. In other words five jets can be maintained at a height of three hundred (300) feet above sea level, which more than meets the requirements prescribed by "Fire Service," viz.: the maintenance of one jet 250 feet above sea level. As the elevation of the lake, from which this water is to be taken direct by a pipe sixteen inches in diameter, is four hundred and thirty-five (435) feet above sea level, anyone with common intelligence will understand that even if this city were three hundred feet above the sea level, a jet could be thrown still a hundred feet higher, but it would not deliver 1500 gals. a minute at that elevation.

Yours truly, "ENGINEER."

Vancouver, May 11, 1887.

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THE WATER WORKS.—MR. SCHUSSLER'S REPORT

We have not deemed it necessary to say much about the proposed water works for the city hitherto. From what we saw of the action of the council in connection with the agreement they were negotiating with the company, we felt that the interests of the city were safe in their hands. They took every precaution to guard its interests and have completed such an agreement as, we think, the most critical will not be able to find much fault. Even the expense of taking the vote and the cost of Mr. Schussler's report have been provided for, in the event of the company failing to comply with the terms of the agreement. This has been done rather as a matter of business precaution than from any supposition that the company will not proceed with the work. Indeed any such supposition would be out of place, as they have spent both time and means in making preparations to undertake the work, and have bound themselves to complete it within a year from the time the agreement is fully ratified.

The construction of water works is one of those undertakings which the general public has no very adequate information about. Very few could tell, with the limited knowledge they possess, the cost of material, the character and cost of excavation and the like, which enter into their construction, whether the sum named by the company was sufficient to complete the works. The Council took the wise precaution of submitting the question of cost and the sufficiency of the proposed materials to a practical and experienced engineer. It will be seen from Mr. Schussler's report, which will be found on the first page, that his estimate of the cost of the works will fall within that named by the Company. He refers at some length to the nature of the material proposed for their construction and pronounces it as sufficient for the purpose. It will be noticed

that Mr. Schussler had only before him the memoranda submitted by the Council and on these his report is based. That it comes within the estimated cost shows clearly enough that the Company will have sufficient means to carry out their undertaking with the Council. The report of Mr. Schussler being the independent opinion of a practical man and uninfluenced by any knowledge of the Company's estimates, is the best evidence for the guidance of the rate-payers which could possibly be obtained. Those who have not the necessary knowledge of their own have, to a great extent, to be guided by that of others, and when that other has no personal interest to serve, he may fairly be considered a pretty safe guide.

All this of course refers to the practical part of the undertaking and shows what a supply of water can be obtained for from the Coquitlam Lake. There are other questions in connection with this water supply which might be discussed in this connection, but of very secondary importance to the primary question. They are more of the nature of preferences, supposed advantages and such like. We presume that the Council has not been spending time in maturing arrangements for a water supply without the conviction that it was a necessity and required by the property owners. If that is so then no question of mere preference, or supposed advantage ought to nullify the work of the

Council. If a good water supply is required, and we suppose almost every person in the city will admit this, in fact the health and safety of the city depends largely upon it, as little time as possible should be lost in securing it. If the by-law is voted down it would be difficult to say when other arrangements might be matured and the results arising from this delay might prove very disastrous to the prosperity of the city. Property holders should give this question their careful consideration, for it rests with them to say whether the city shall have an adequate water supply within a year or not.

CORRESPONDENCE.

Another Letter from Mr. Arthur Hill, C.E.
To the Editor of the News-Advertiser:

Sir,—If, as may fairly be presumed, "Fire Service" has corrected, all typographical errors in his first letter to your paper, and will reaffirm over his own signature his statements as now amended by himself, respecting the efficiency of the Coquitlam Company's proposed works, the public shall have an opportunity of judging of his fairness as a censor and reliability as a critic in this matter. He need not be apprehensive, however, of many columns being devoted to comment upon his views.

Yours, &c.,

Vancouver, May 12. ARTHUR HILL.

"Fire Service" and Foreible Facts.

To the Editor of the News-Advertiser.

I am glad to find that "Engineer" in his letter, published this morning, so thoroughly agrees with my ideas on the subject of an efficient fire service for the city of Vancouver. I was curious to know, why an elevation of one hundred (100) feet above sea level, was chosen by the water-works company as the defining point of the effective power of their proposed fire service, while no mention was made of any higher levels. "Engineer's" letter gives the required explanation, viz: That only at an elevation of one hundred feet above sea level, can the conditions specified in the agreement (which distinctly agrees to provide an efficient fire service) be fulfilled. With all due deference to "Engineer's" boasted knowledge of hydraulics (perhaps he might tell us when and where he acquired it) I beg to submit for his consideration, and also for that of the people of Vancouver, the following query:

If it is necessary for an efficient fire service, to maintain such water works as will be capable of, and shall maintain a pressure in the city equal to sixty pounds per square inch at the height of one hundred feet above sea level, while delivering fifteen hundred (1500) gallons per minute, is it not equally necessary to have the same service in the higher levels, the more so as they cover a large area of the city, and may be densely populated at no very distant date, and when, owing to exposure to high winds, large conflagrations, two and three at a time, may occur. The 13th of June last is too fresh in our minds to let us forget what may again happen. I would recommend "Engineer" to refer to his hydraulics and inform us what service will be required for two or three fires in full progress at one time.

"Engineer" confesses the inability of the company to provide 60 pounds pressure with 1500 gallons discharge at an elevation of two hundred feet (200) or even at one hundred and fifty (150) above sea level. It is, therefore, self evident that the proposed fire service is not a thoroughly efficient one for all levels, and may possibly result in disastrous consequences to the city.

Mr. Arthur Hill, C.E., in his communication in another column, treats of points which are entirely without bearing on the subject. He must be quite aware of this, and I am surprised his well known good sense did not prevent his troubling you with a letter that has only excited amusement.

Your obedient servant,

FIRE SERVICE.

Vancouver, May 12th, 1887.

To the Editor of the News-Advertiser.

Sir,—In to-day's issue of your paper "Citizen" calls attention to the fact that there is no time specified in the agreement between the Coquitlam Waterworks Company and the corporation in which the company is to begin work. Although the time of commencing work is not specified, the agreement provides that the company will construct the waterworks for the supply of the city within one year after the bylaw becomes law, and approved security to the amount of five per cent. on the amount guaranteed is required to be put up by the company that this condition be fulfilled.

Consequently in order to comply with the agreement, viz: to construct this work in one year, and also to save its security, the company is as fully bound to commence the work within a reasonable time after the agreement with the city is ratified as if it was so stipulated in this agreement.

SPECTATOR.

VANCOUVER, MAY 12TH, 1887.

(1887)

CORRESPONDENCE.

Points of Interest to Ratepayers.

To the Editor of the NEWS-ADVERTISER:

SIR,—Inasmuch as the Herald has summoned up courage to take a decided position on the waterworks question, and on the strength of Mr. Hermann Schussler's letter has strongly advocated the adoption of the Coquitlam Company's scheme, the following remarks on this gentleman's letter may be of interest to the editor.

Without intending the slightest disrespect to Mr. Schussler's position and standing, I beg leave to submit the following remarks to the consideration of Vancouver's contractors and practical men, viz:—

Mr. Schussler's letter is not a report on the Coquitlam Company's scheme, but on an ideal line of pipes laid in an ideal country.

He gives no existing examples of the particular style of pipe he recommends.

He gives no opinion as to whether this large undertaking can be completed in one year, although this was one of the most important points the council was to bring to his notice.

He distinctly states he is ignorant of the cost of iron in Vancouver. His price is based, therefore, on a foreign market, and will be heavily increased by duty and freight to Vancouver.

He states the pipe joints will allow of considerable curving. To avoid ravines, there will be either sudden turns, for which cast-iron bends will be required, or much trestling and boxing. He makes no allowance for these in his estimate.

He gives the cost per pound of entire 16-inch pipe complete, in the ground, and ready for service as 9 cents per lb; his estimate being based on total number of pounds of sheet iron. This cost of 9 cents does not include rivets, which he states elsewhere amount to 70,000 pounds at 7 cents, equal to \$4,900. This omission must be added to his total cost.

He states the cost for coating, hauling, ditching, etc., to be 2 cents per pound, the number of pounds being 2,096,160. This gives \$41,923 as the total cost for 20 miles.

For safe protection against all possible frosts in this climate, the upper surface of water pipes must be at least 3 feet under ground. "Fanning on Hydraulics" gives the depth in eastern cities in north latitude, 40 degrees (nine degrees south of Vancouver) as 4 feet. Therefore the smallest possible ditch to contain a 16-inch main will be 2 feet wide at bottom, 3 feet wide at top, and 4 feet 4 inches deep. One mile of such a ditch will necessitate 2,118 cubic yards excavation, and the same amount of re-filling. As a uniform ideal ditch can nowhere be obtained, at least 50 per cent. more excavation must be added to cover such cuttings as may be 5, 10, 15 or 20 feet deep, which will make a total excavation per mile equal 3,177 cubic yards. Throughout this locality, earth is scarce, hardpan being met within one foot of surface. Solid rock and boulders are in abundance. Few contractors will undertake this excavation for less than 50 cents per yard. An estimate for one mile will therefore be

Excavating all material met with, 3,177 cubic yards at 50 cents..... \$1,588 50
Re-filling, covering rock bottoms, ramming, etc., 3,177 cubic yards at 25 cents..... 794 40

Cost per mile.....\$2,383 00

For 20 miles the total cost will be \$47,660, or nearly \$6,000 more than Mr. Schussler allows for excavation, re-filling, laying, lead, fitting, coating, hauling, making roads for hauling, clearing pipe track, stumping, etc., etc.

Mr. Schussler's prices for ditching, etc., for distribution pipes are similarly far too low for Vancouver. The cost of taking up and replacing planking, at say \$2,000 per mile, is omitted by him entirely.

His allowance for contingencies is 0.2 cts., equal to one-fifth of a cent per pound of sheet iron. This is considerably under 2½ per cent. Engineers invariably allow for contingencies 10 per cent. of the whole estimate.

I am of opinion that the above remarks will conclusively show to all practical men that Mr. Schussler's estimate is entirely unsuited to this country. At all events I am willing to leave the matter to their judgment, and trust they will express it through your columns.

Your obedient servant,

HENRY B. SMITH.
Vancouver, May 14, 1887.

VANCOUVER WATER SUPPLY.

The Coquitlam Scheme Adopted by the City Council—A Comprehensive Project.

At their meeting on Monday night last, the city council of Vancouver finally adopted the agreement submitted to them by the Coquitlam waterworks company, under which the company is to supply water to the city from the Coquitlam lake, the elevation of which is 435 feet above sea level. The bylaw to authorize the guarantee of interest by the city on the company's bonds, was also finally passed by the council. Three per cent. per annum, payable half-yearly for ten years, is to be guaranteed by the corporation on the company's six per cent. first mortgage bonds, to an amount not exceeding \$280,000, the guarantee to become effective when the main pipe and three miles of distribution pipe shall have been laid. The Coquitlam company has a magnificent source of supply in the Coquitlam lake, which they propose to tap direct by a sixteen-inch pipe. The supply is unlimited in quantity at all seasons, and unexcelled in quality.

Their main pipe is to be of double rivetted, wrought iron or mild steel plate, of 10 to 12 B.W.G. in thickness.

Their designs and estimates of cost have been fully confirmed by an independent report of Mr. Schussler, chief engineer of the Spring Valley waterworks, San Francisco, made to the Vancouver City Council. The project of the company is a comprehensive one, including the supply of the city of New Westminster as well as Vancouver, and will bring in and put in circulation a large amount of capital. Since obtaining their act of incorporation they have displayed commendable energy and enterprise.

We wish them success and congratulate Vancouver on her prospect of securing, through the medium of their works, before the expiration of another year, efficient protection against the recurrence of the disaster that devastated their city in June of last year.

The Capilano Waterworks Company.
To the Editor of the NEWS-ADVERTISER.

Vancouver, May 14th, 1887.

SIR,—I am authorised by the Vancouver (Capilano) Waterworks Company, in the absence of the secretary, to publish officially the following telegram received on Friday afternoon.

San Francisco, May 13th, 1887.

To J. W. MacFarland, Secretary-Treasurer, Vancouver Waterworks Company, Vancouver.

Will construct Capilano Waterworks at once without guarantee from city.

(Signed) JOHN IRVING.

By affording this a space in your issue of Sunday, you will much oblige.

Your obedient servant,

HENRY B. SMITH.
For the Vancouver Waterworks Co.

More About Waterworks.

To the Editor of the News-Advertiser.

SIR,—I beg to apologize for trespassing on your space, but as some of your readers may have the same impression under which "Fire Service" seems to be laboring, viz.: That in order to have an efficient service the works must be capable of delivering the same quantity of water under a given pressure at different altitudes.

I would explain that the fulfillment of such conditions is physically impossible; and that as the area of the city above one hundred (100) feet elevation is only a small fractional part of the total area, and as the proposed works will be capable of supplying an abundance of water under a pressure of sixty (60) pounds per square inch at the highest points of the city, they may be considered as fully efficient. If "Fire Service" does not concur in that belief his standard of efficiency is much higher than that of the promoters of either of the companies recently under the consideration of the council.

In the case of the Coquitlam Co. the capacity of the works, as set forth in the agreement, will be capable of delivering 1,500 gallons per minute at one hundred (100) feet above sea level under pressure of sixty (60) pounds per square inch. The capacity of the Capilano Co.'s works would be at least four hundred and thirty gallons per minute at sea level, the distance from sea to point of delivery nine miles, and diameter of pipe twelve (12) inches sufficient to deliver a little less than 1,100 gallons per minute under similar conditions to those above named. Now that the council have adopted this one of greater efficiency it does seem rather hard that even it, according to "Fire Service," is not up to the mark. All the more so that they had not the benefit of his advice before they came to a decision. The only inference to be drawn from his silence, therefore, is that either he had not looked into the question till lately, or else he saw that the advocacy of a higher standard of efficiency than that of the Coquitlam Company might be embarrassing to any other company of less proposed.

ENGINEER.

Vancouver, May 14th, 1887.

THE TARIFF CHANGES.

A great deal of interest was displayed as well in the other provinces of the Dominion as in British Columbia, as to what changes would be made in the tariff. Expectation has been set at rest and the tariff as wired from Ottawa is, on the whole, complete. There seem to be a few inaccuracies doubtless, due to errors in transmission such as are always liable to occur. For instance in several cases the same rate per cent. is given for different articles under last year's and this year's tariff. This will be remedied when the returns are received from Ottawa. As a rule there is a gradual raising in the various articles which can be manufactured in Canada, though these cannot be said in the main to be very excessive. It may be interesting to note some of the changes: Paper, calendered or not, was 22½ per cent. and has been raised 2½ per cent. Writing paper, not calendered, was 20 per cent. and has been increased 5 per cent. The duty on both is now the same, viz: 25 per cent. Labels for fruit, vegetables, meat, fish, etc., and also tickets, posters, advertising bills and folders were under the old tariff 10 cents per lb. and 20 per cent., and are now 15 cents per lb. and 25 per cent. Cigars and cigarettes were \$1.20 per lb. and 20 per cent., but are now \$2.00 per lb. and 25 per cent. Potatoes have been raised 5 cents per bushel. Coarse and fine salt, formerly free, has been raised 10 cents per 100 lbs. in bulk, and in bags or barrels 15 cents per 100 lbs. Earthenware, stoneware, Rockingham, white granite, iron, stoneware, etc., have been raised 5 per cent., being now 35 per cent. In buggies, farm wagons, farm railway or freight carts, pleasure carts or gigs, the tariff has been as a rule raised, railway carts especially so. Table glassware, which was 30 per cent., is now 10 cents per doz. and 30 per cent., a heavy increase. Sole leather has been slightly reduced, the tariff being 3 cents per lb. In an invoice yesterday of 20 soles the difference between the old and new tariffs was \$2.40. The reduction will of course be correspondingly greater on finer articles. Japanned, patent or enamelled leather has been raised 5 per cent. being now 25 per cent. Floor oilcloth was 30 per cent. and has been raised 5 cents per square yard and 20 per cent. Other oil cloth under item 318 has been raised 5 per cent. School slates have been raised 1 cent. each. Valises, satchels, carpet bags, pocket books and purses were 30 per cent. and are now 10 cents each and 30 per cent.—a raise of 10 cents each which is quite a consideration in those small articles. Twine of all kinds, except those used in the fisheries which are on the free list, formerly 25 per cent. are now 1 cent. per lb. and 25 per cent. There is a raise on tomatoes (green) of 20 per cent. and on other vegetables of 5 per cent. Item 475, including all fabrics composed wholly or in part of wool worsted, the hair of the alpaca, goat or other animals upon which there was a duty of 22½ per cent. *ad valorem* has been repealed. They now go under item 473: "all fabrics wholly or in part of wool, worsted, hair of alpaca, goats, etc.," upon which there is a duty of 7½ cents per lb. and 20 per cent. Shirt collars, before 30 per cent., are now 24 cents per dozen and 30 per cent.—a heavy increase. Cuffs, before 30 per cent., have been increased by 4 cents per pair. Gas meters have been raised 5 per cent., being now 30 per cent. Mucilage has been considerably raised. The minister of customs, who has a practical knowledge of the ills under which newspapers suffer, has put a duty of 25 per cent on newspapers partly printed. This will have a tendency to keep out holiday periodicals and advertising sheets. Linen or cotton shirts have been raised \$1 per dozen, being formerly 30 per cent. Colored fabrics, before 20 per cent., are now 25. The duty on macaroni has almost been doubled. There is a considerable reduction in the oranges and lemons. An immer is noted in the duty on chopp—being before 30 per cent.

\$2 per dozen and 10 per cent. Broad axes, adzes, etc., have been raised to \$3 per dozen and 20 per cent. all others and knives and five-pronged forks, \$2 per dozen and 20 per cent. Hoes and garden rakes are a notable increase, indeed in all these lines of goods the results of the changes in the tariff are most apparent. These latter are \$1 per dozen and 20 per cent. Bar iron has been raised, being now \$11 per ton. Wire of spring steel is now 12½ per cent. and was before free. This is used in making mattresses. Boiler and other iron plate is now \$10 per ton. Hoop, band or scroll or other iron, eight inches or less in width and thinner than No. 20 gauge, \$13 per ton; a large increase. The same thinner than No. 20 gauge 12½ per cent. Rolled channels and angle and T iron is a new item, the duty being 12½ per cent. Iron bridges and structural iron work \$25 per ton, provided that the duty shall not be less than 30 per cent. This is a raise of 5 per cent. Malleable iron castings and steel castings have been raised 5 per cent. Plates, sad irons, tailors' irons, etc., have been raised 5 per cent. Iron or steel axles, axle bars, etc., without reference to the stage of manufacture, \$30 per ton, but not less than 35 per cent. This is an increase of 10 per cent. Locomotives and other steam engines, boilers and machinery, composed wholly or in part of iron and steel, 30 per cent., being a raise of 5 per cent. Locomotive tires or Bessemer steel in the rough are a new item, the duty being 10 per cent. Boiler tubes or flues, or stays of rough iron or steel, a new item, 15 per cent. Safes have been raised 10 per cent. Scales, formerly 20 per cent., are now 30 per cent. Wire, except for submarine cables, is the same as before. Sledges, track tools, wedges and crow bars of iron and steel are rated at 1½ cents. per lb. and 30 per cent., an increase of 1½ per cent. Carriage hardware 35, and all others 30 per cent. Cut nails and spikes of iron formerly ½ cent. per lb. and 10 per cent. are now 1 cent. per lb., a heavy raise. Fire brick on which a duty of 20 per cent. was formerly levied is now on the free list. Anthracite coal, now free, was under the old tariff 50 cents. per ton. Bituminous coal remains as it was, 60 cents. per ton. Jeans 25 per cent., a raise of 5 per cent. Printed or dyed cotton fabrics formerly 27½ per cent. are now 32½. Demijohns or jugs, churns or crocks, have been raised 1 cent. per gallon holding capacity, being now 3 cents. Gold and silver leaf have been raised 5 per cent. Sewing machines under the new tariff \$3 specific duty and 20 per cent. have been raised \$1 each. Plated knives before 30 per cent. are now 50 cents per dozen and 20 per cent. all other electro-plate ware 30 per cent. Manufactures of plumbago have been raised 5 per cent., being now 25 per cent. These are the principle articles in the tariff in which any appreciable increase can be noted, though in some of the minor items the tariff makes radical changes. It will be noticed that great protection is given to iron and steel manufacture, and it is only for our wealthy men themselves to say whether or not they will take advantage of the government's action. The object of protection is to conserve home industries and there is ample scope in this province for the building of factories and investing money now lying idle. Of course in the changing of tariffs individual cases of hardship will occur, but these can be remedied against. We heard of a case in point yesterday. It will be noticed that the duty on cast iron pipe of every description is \$12 per ton. The new tariff will make a difference of about \$3 per ton, so that several gentlemen who have made large contracts will be heavy losers. Had a clause been inserted in their contracts providing for such a contingency, such a result would not have happened. On the whole, we think, the country may feel well satisfied with the tariff changes, and it is very evident the government have an eye single to the good of this young and promising Dominion of ours.

(1887)

(64)

The letter which we publish to-day from Mr. H. B. Smith, for the Vancouver Waterworks Company, informs us of a step taken by that company which may be of vast importance to the taxpayers of this city. He gives us a copy of a telegram from Mr. John Irving, who is at present in San Francisco, which states that the company have decided that they will construct the waterworks for a supply to this city from the Capilano Creek at once and without any guarantee from the city. The gentlemen who form the Capilano Company are men of means, most of them residents in Victoria and Vancouver, and well known to our citizens. There is no reason, therefore, to doubt their ability to build the works without any guarantee from the city, if they wish to do so, and the telegram from Mr. Irving would seem to show that this is their intention.

We regret that they did not see their way to take such a course some months ago when they put their proposition before the council. In common with most of the citizens we are not interested in either company, and do not care which of them supplies the city with water as long as it is brought to the city by a system properly constructed, is pure in quality and abundant in quantity. For the rest all we asked was, in the case of the city assuming any responsibility, that its interests should be properly protected. This being done we would have willingly desired to see the company, which ever it was, have fair treatment in every respect.

As all our readers know the council rejected the proposal of the Capilano Company, and agreed to give the city's guarantee to the Coquitlam Company upon the agreement as settled if the voters authorised them to do so by the election to be held on the 4th June next. This is how the matter now stands. But the intention now expressed by the Capilano Company may have, and we think it will, a very strong influence on the voters. They will argue that if one company can build their works without a guarantee, that the other should be able to do so. Or that if they cannot, the city had better not commit itself to any responsibility when it appears that in any case water will be furnished without the city doing anything. In that case if the by-law be beaten it may cause the Coquitlam Company to withdraw from the field, or they may decide to go on all the same with the works though without a guarantee. The city would then have a supply from two sources.

In any event when we can only see that this action on the part of the Capilano Company must involve the city at a disadvantage, and the fact that a body of capitalists are willing to take the whole responsibility of the works on themselves is a splendid endorsement of the prospects of Vancouver, whilst at the same time it shows their complete confidence in the feasibility of their own scheme.

Coquitlam vs. Capilano.

To the Editor of the News-Advertiser.

SIR,—From the new departure of the Capilano Company as indicated by Captain Irving's telegram, and assuming it to be bona fide, the position into which it aims at drawing the city is simply this—that the Coquitlam Company's proposition and the agreement based upon it being rejected, and free fire protection, and one-eighth of profits deducted; the city would be placed at the mercy of a monopoly, which in the natural course of business would extort the last dollar allowed under its charter.

By the agreement with the Coquitlam Company the city's interests are unusually well guarded, and a greater actual annual cash value is secured in the shape of the fire protection provided than the total annual guarantee could cost the city, even if the amount guaranteed were actually to be paid, which it is not—the fact being that if the city should ever be called upon to advance a dollar, under its guarantee it holds ample security for its reimbursement by a first lien on the company's revenues.

A question which has become of paramount importance to the citizens may be narrowed down to this: Shall the city have a voice and interest in the conduct of its water service, or shall the opportunity of doing so, now secured by agreement with the Coquitlam Company, be thrown away; and this exceedingly important service, than which none touches more intimately the future prosperity of Vancouver, be relegated to an irresponsible corporation?

Unimpaired by any such stringent agreement as that under which the Coquitlam Company would be bound in perpetuity.

Yours truly, A. AQUARIUS.
Vancouver, May 17.

CORRESPONDENCE.

The Coquitlam Water Works Scheme.
To the Editor of the News-Advertiser.

SIR—In your issue of Sunday you published a letter from Mr. H. B. Smith, commenting on Mr. Schussler's report re Coquitlam water works.

Partly through inadvertence, and partly no doubt on account of some typographical errors in the printed copy of Mr. Schussler's report, some of Mr. Smith's remarks are calculated to convey a wrong impression, an effect which I am sure was not the intention of the gentleman to produce.

For instance Mr. Smith states that "Mr. Schussler's letter is not a report on the Coquitlam Company's scheme, but on an ideal line of pipe laid in an ideal country. He gives no existing examples of the particular style of pipe he recommends."

From the above statement of Mr. Smith one unacquainted with the subject would naturally suppose that it might be questioned if works have actually been carried out in which were adopted the particular kind of pipe recommended by Mr. Schussler. Now in Mr. Schussler's letter, after giving a detached description of the pipe joint used in this particular kind of pipe, Mr. Schussler definitely states that he has used it in the Sandwich Islands on pipes forty-one (41) inches in diameter, and being in operation for eight (8) years.

For general information I will cite a few of the many instances where riveted plate pipes, furnished by the Klason iron works of San Francisco, and made on the same principal as those proposed to be used by the Coquitlam water works Company and recommended by Mr. Schussler are now in use.

Forty-six miles for the Spring Valley water works company California, varying in diameter from eighteen to fifty-two inches. The Cherokee Flat mining company thirty inches diameter over three miles. The Virginian and Gold Hills water works 11½ inch diameter, pressure over 1750 feet in some places three miles long. The White Pine water works company twelve inches diameter.

The Portland water works company 41 miles thirty and one half inches diameter.

In Fanning's treatise on water supply engineering the writer, in referring to asphaltum coated wrought iron pipes, remarks: "Wrought iron pipes coated with asphaltum have been used almost exclusively in California, Nevada and Oregon."

In the specification for the water supply of the City of Portland Oregon, drawn by Mr. Isaac W. Smith engineer of the water Committee, it is stated that the works will include thirty-one (31) miles of wrought iron pipe, 27 and 22½ inches diameter.

The principal of construction of the above works is precisely similar to that recommended by Mr. Schussler and which is being largely adopted throughout the United States and elsewhere, but as an enumeration of the instances in which this style of pipe has been adopted, would occupy too much of your space, I will not further refer to them. Mr. Schussler bases his estimate of cost of ditching, hauling, road making, stumping etc., on his knowledge of the cost of similar work in Oregon, where the general character of this province. Mr. Smith states that rivets are not included in Mr. Schussler's estimate, but if he refers to Mr. Schussler's letter he will see this statement.

"In the following estimate, which is based upon the number of pounds of iron in the sheets, required allowance is made for rivets mechanical work etc., etc., the forest growth and soil is similar to that cited where Mr. Smith's opinion differs from that of Mr. Schussler, (who states: "The suggestions dimensions and estimates are based on twenty-three years of active experience in business of economical and practical water works construction") can be left as Mr. Smith suggests to the judgement of all practical men.

Yours truly,
E. A. WILMOT.
Vancouver May 16th 1887.

CORRESPONDENCE.

Capilano versus Coquitlam.

To the Editor of the NEWS-ADVERTISER.

Sir,—“Aquarius,” in your issue of this morning, discusses the water question from a decidedly Coquitlam point of view. The “new departure,” (as he calls it), of the Capilano Company will be of far more value to the city and its citizens than the existing arrangement with the Coquitlam Company.

The Coquitlam Company in return for the city's pledging its credit to the extent of \$280,000, gives only an eighth share of possible profits realized within the city limits. By reference to the agreement “Aquarius” will see that free fire service is not given, as the Company is to receive \$15 per hydrant per annum.

In the event of the Coquitlam Co., being unable to pay the amount of the guarantee, (as stated by “Aquarius,”) the annual cost to the city would be:—

Interest on \$280,000 at 3 per cent. \$8,400
Hydrants, say 100, at \$15..... 1,500

\$9,900

Now the annual cost, as per the new departure of the Capilano Co.: Hydrants, say 100, at \$25, \$2,500; a clear gain to the city of \$7,400 per annum.

Had “Aquarius” ever read the charter of the Vancouver (Capilano) Company he would not have feared that the defeat of the by-law would leave the city at the mercy of a monopoly.

This charter distinctly allows the city the right to purchase the works at a fair valuation on giving one year's notice. It also gives the city the right to limit the company's profits to twenty per cent. per annum.

If the works pay well the city can step in and have all the profits. If they don't pay the city has a fire service at a nominal cost and no responsibility, so that instead of a grasping “monopoly” the entire control of the Capilano Company is available by the city, which is a far different matter from having one-eighth interest in the profits realized within the city limits. This interest will not, I imagine, give them very much “voice or interest in the conduct of its water service.” The Coquitlam Company has no such provision in its charter, but Mr. Corbould informed the city council that his company were getting their charter amended so that the city would be enabled to purchase their works.

So far the amendment has not been made, and if the by-law carries it is not at all likely that they will apply to the legislature for an amendment in this respect.

“Aquarius” says the city's interests are unusually well guarded. This may be so, but not until the question was thoroughly ventilated through your valuable paper, and in the council chamber, and the agreement which was accepted, is not yet in strict accordance with the Coquitlam proposition of March 14th.

The Capilano Company has never varied from its straight forward, business-like proposal, except in its final, where it dispensed with a few not altogether unnecessary items of cost and slightly lessened the amount to be guaranteed by the city.

It would appear that “Aquarius” has blundered in calling the Capilano Company “an irresponsible corporation,” as a careful perusal of its charter will show that the city has, or rather, can have a very great supervision of its affairs.

Should the voters decide to defeat the by-law there is no reason why a satisfactory arrangement cannot be made with the Vancouver (Capilano) Waterworks Company.

Yours truly,

J. W. McFARLAND,
Vancouver, May 18, 1887. Secretary.

COMMUNICATIONS

To the Editor of the NEWS-ADVERTISER.

Sir,—It has been urged that the Coquitlam guarantee should be voted down because the Capilano Company has asserted that it will construct water works without any city guarantee. Before allowing themselves to be influenced by this action of the Capilano Company, so far as to vote against the by-law, it will be well for the voters to remember that if the by-law is passed and the Capilano Company proceeds with the construction of water works the city can suffer no pecuniary loss, even should the Coquitlam Company retire from the field, as according to its agreement the city's guarantee does not come into effect until the water is brought into the city.

The amount to cover the expenses of election (in case the company fails to comply with its agreement as regards furnishing security) has already been deposited with the city treasurer.

On the other hand, if the by-law should be voted down the city will have to bear the expense of the election as the agreement will not be ratified by the corporation, and then if the Capilano Company should, from any cause whatsoever, fail to carry out its project the city would be left without a water supply for an indefinite time.

PRUDENCE.

THE HERALD.

FRIDAY, MAY 20, 1887.

WATER WORKS QUESTION.

Who is Henry B. Smith? We mean that particular Smith who is wrestling with the water supply for this city as if his bread and butter, if not his very existence depended upon the success of the scheme which he is so bravely advocating. What we want him for is to inform him confidentially that he is somewhat astray in the diagnosis he has given of our trouble. It was not so much the want of courage as the want of the precise knowledge required to speak intelligently about the construction of water works. We felt that it would be necessary to have the opinion of some well-known authority on the construction, cost and fitness of proposed material before venturing to recommend either of the proposed schemes to the ratepayers. Had we known that there was a hydraulic engineer about the city, of an independent turn of mind, we probably would have tried to get some information from him about the water works question. The fame of Mr. Henry B. Smith had not, however, reached us, and we suppose ours is not an exceptional case. The Council would certainly not have referred the question to Mr. Schussler had they known of the available talent within the city limits capable of giving an unbiased opinion on the merits of the two schemes. We notice that Mr. Smith's opinion would probably not have agreed with that of San Francisco's eminent engineer, but doctors and lawyers differ and why should not engineers? We are pleased to see that Mr. Smith has no intention of casting the “slightest disrespect on Mr. Schussler's position and standing.” It may be probable that after reading this de-

laration Mr. Schussler will feel easier in mind. A magnanimous opponent, who, for ought that is publicly known about him, may, from native modesty, have been hiding his hydraulic knowledge under a bushel or some other convenient place, is not to be sneezed at. We will probably not be able to appreciate to their full extent all the friendly criticisms of Mr. Smith in regard to Mr. Schussler's report or letter if he likes that word better. Nor will it be necessary to make much reference to them, as that has already been done by others. It might be said that his complaint about the absence from the report of the time required to complete the works is not a very weighty one. We suppose the construction of water works is like almost everything else in those days, depend upon the number of men employed. His frost story belongs, we suspect, to the glacial period, and “Fanning,” whom he gives as his authority for saying that water pipes require to be buried three feet in the ground to be safe from frost in this part of the world, might amend his statement with advantage, if stating facts be any object with him. Actual experience is probably as good as Mr. Fanning, the theorist, and it teaches us that six inches instead of three feet is about the distance that frost penetrates the ground on Burrard Inlet. Latitude alone has remarkably little to do with the frost line. We need hardly remind a hydraulic engineer of the standing of Mr. Henry B. Smith, that there are such things as isothermal lines. A physical geography of British North America will show that their points of intersection with the degrees of latitude are very irregular. Not a very great deal can be predicted from them unless some information about the surrounding conditions are known. In so far as the three feet of frost here is concerned, Mr. Smith may safely reduce his calculations as regards the cost of excavation.

After all, is the exact time of completing the works, and their cost to a dollar, for these are the principal points with which Mr. Smith deals, the vital questions in making a selection between the two companies. Having been satisfied on good authority, that the material to be used is suitable for the purpose and that the works can be completed for the amount named, the ratepayers generally will feel themselves competent to arrive at a decision respecting the other questions involved. They all know that water will run down hill if the proper facilities are provided. They know, too, that a continuous line of pipes laid in the ground is safer than if it had to cross the Inlet at the narrows, or any other part and very few will care to run serious risk when it can be avoided. That there is greater danger of accident to pipes in the Capilano scheme than in the other we do not suppose even Mr. Smith will deny. Other things being equal why should that risk be undertaken when so much depends upon a constant and sure supply of water. Certainly no person with anything at stake would knowingly select a doubtful to a certain source of protection. Crossing a place like the Narrows is to a great extent an experiment and an experiment that few would care to make when results must be attended with a great deal of uncertainty.

CORRESPONDENCE.

Mr. H. B. Smith on the Coquitlam Scheme.
To the Editor of the News-Advertiser.

SIR—In my letter of May 14th I took the liberty of making a few remarks on Mr. Hermann Schussler's letter of advice to the city council. Mr. E. A. Wilnot, chairman of the Coquitlam Waterworks Co., publishes an ostensible reply in your issue of this morning. As Mr. Wilnot has not refuted one single argument used by me I cannot but consider his reply as an entire failure.

He fails to show that Mr. Schussler's letter is a report on the Coquitlam Waterworks Co.—that he gives existing examples of the kind of pipe he recommends—that he expresses an opinion as to whether the works can be completed in one year or not.

He fails to show that Mr. Schussler's prices are prices in Vancouver—that he includes in his estimate the cost of rivets, cast iron bends, boxing and trestling—that his allowance of 2½ per cent. is sufficient to cover contingencies, for which engineers invariably allow ten per cent.

He fails to show that excavation, and all the other items included under this head, can be done in and around Vancouver at Mr. Schussler's prices, and finally he does not attempt to show that Mr. Schussler's estimate can in any way be applied to this country.

I again repeat that Mr. Schussler's estimate of cost, 9 cents per pound, does not include the cost of rivets. He distinctly states he assumes the cost of iron at 3½ cents per pound, and rivets at 7 cents. He then tabulates his items, plainly omitting rivets in his total. With the fact before his eyes I cannot understand Mr. Wilnot's disputing it.

Mr. Schussler's reference to the Sandwich Islands is in connection with a pipe-joint—not a pipe. Mr. Wilnot's examples of similar pipes include a pipe for mining purposes and the Portland water works, which are not even begun.

To conclude, I would be pleased to learn from Mr. Wilnot, or any other competent authority, how it is that pipe factories are in existence all over the world, daily filling large orders for manufactured pipes, when home-made sheet iron pipes are so superior and so immensely cheaper. It would also be an item of interest to know how much the cost of the lengthy system of the Coquitlam Company will be increased by the recent change in the tariff, which affects wrought iron and cast iron and steel so much.

Your obedient servant,
HENRY B. SMITH.

Vancouver, May 21, 1887.

A Letter from Mr. Corbould.

To the Editor of News-Advertiser.

SIR—I notice in your issue of yesterday a communication from Mr. J. W. McFarland, the secretary of the Vancouver Waterworks Company, in which he states that I "informed the city council that the Coquitlam Waterworks Company were getting their charter amended so that the city would be enabled to purchase their works." I am at a loss to know where Mr. McFarland obtained his information, as I never made such a statement to the city council, nor to any person directly or indirectly. I distinctly told the council that the legislature purposely left the purchase clause out of the Coquitlam Company's charter, as the purchase gave that company the right to supply water to more than one place; and as the charter does not confer any monopoly upon the company.

The city has it in its power to obtain its water supply at first cost of the works by constructing them itself, if the company should hold out for unreasonable terms.

I said further to the council, and I say so still, that the right to purchase given by the Vancouver Water Works' Charter is upon conditions virtually prohibitory, and that the city could build water works for itself from the same source more cheaply than it could purchase the Vancouver Water Works on the terms given by that company's charter.

Let us see what this right of purchase amounts to if the city wishes to purchase the works, say in ten years, per clause 35 of the Vancouver Water Works' Charter, statutes of 1886:

The first cost of works as per the company's own statement.....	\$275,000
20 per cent on cost of works in addition.....	55,000
Expenses of maintenance, (very uncertain owing to unknown and incalculable risk of crossing the narrows), say 2 per cent. per annum for 10 years—which is very low.....	55,000
Expenses of operation for 10 years say.....	75,000
10 per cent. per annum on the paid up stock or on the cost of works for 10 years.....	275,000
	\$735,000

Thus it will be seen that the right of purchase in the Vancouver Co.'s Charter really amounts to no such advantage as Mr. McFarland tries to make out. It is, in fact, as it was no doubt intended to be, a dead letter.

GORDON E. CORBOULD.
New Westminster, May 20, 1887.

More About Waterworks.

To the Editor of the News-Advertiser:

DEAR SIR,—If Mr. Corbould will refer to the meeting of 7th February last, I am sure he will remember making the statement referred to, and if he can't recall it, there are several persons willing and able to refresh his memory.

His criticisms on the purchases clause in our charter are very unfair, and calculated to create a wrong impression.

In the first place, the only time we ever gave an estimate of the cost was on the 5th January, when Mr. Keefer told the council our estimate was \$240,000.

The purchase of the work by the city is provided for by the arbitration clause, and as every class of work is liable to depreciation, the matter will stand thus:

Original cost of work.....	\$240,000
Less depreciation say for 10 years, at say (very small) two per cent.....	48,000

Arbitrated value.....	192,000
To which add 20 per cent.....	38,400

Total cost to city..... 230,400

Consequently if the city purchases at the end of 10 years, the company will get \$9,600 less than the actual cost of works.

The maintenance (Mr. Corbould goes out of his way to cast a doubt on our scheme) as well as the cost of operation for 10 years have nothing to do with the case.

As for the last clause this is a simple business arrangement and a guarantee against possible loss, assuring our company a revenue of 10 per cent. per annum, not a very unreasonable rate of interest. If the works pay as much as, or more than 10 per cent, then the city pays nothing on this account.

If the works were paying 8 per cent. only it might be policy for the city to purchase, as it can borrow the money at 6 per cent., thus making a clear profit of 2 per cent. annually. If the ratepayers go into this question thoroughly, they will find that the omission of the purchase clause in the Coquitlam company is a very serious one. Yours truly,

J. W. McFARLAND.
Vancouver, May 25th, 1887.

A CARD.

OFFICE OF VANCOUVER [CAPILANO]
WATER WORKS CO. (LIMITED.)

VANCOUVER MAY 25th 1887.

To the Electors of the City of Vancouver:

GENTLEMEN—I am authorized by the Vancouver Water Works Co., to make the following statements:

1st. That this company is prepared to supply the city with water from Capilano Creek without any guarantee of interest on their stock or bonds:
2nd. That they will furnish the water within one year from June 1st—

3rd. That they will supply the city with water for fire purposes and place hydrants where directed along their line of pipes, for which a charge of \$25 for each and every hydrant per annum will be made. Said \$25 to cover use of water and hydrant for fire purposes.

4th. If the By-Law is defeated and the City council prefers it our company will supply the city with water as per its proposal of March 14th 1887 with no variation therefrom except as to time limit which shall mean that works are to be completed within one year from June 1st.

5th. That they are prepared to give a bond if required for the due performance of above.

THE VANCOUVER WATER WORKS CO., (LD.)
Per J. W. McFARLAND,
Secretary.

(69)
No

Vancouver, B. C.,

1887

The undersigned, agree to use the water supplied
by the Vancouver Water Works Company, on
premises, provided the rates to be fixed shall be mutually
satisfactory. Supply to commence one year from date.

CORRESPONDENCE.

The Coquitlam Waterworks Co.

To the Editor of the NEWS-ADVERTISER.

SIR—In your issue of the 22nd inst. you publish a letter from Mr. H. B. Smith, in which he states that I did not refute his arguments contained in his previous remarks on Mr. Schussler's report. If Mr. Smith will look over my letter again he will see that I made no attempt to refute his arguments, but merely referred to some of his statements that were calculated to convey an erroneous impression.

I concurred in Mr. Smith's views that the decision of differences of opinions between himself and Mr. Schussler might be left to the judgment of all practical men. I did not think it necessary to become an apologist for Mr. Schussler, nor to support or supplement his views.

Although Mr. Schussler (after describing the principle of the pipe joint) states that he used a similar description of joint in the Sandwich Islands on pipes forty-one inches in diameter, bearing over 300 feet pressure, and being in operation over eight years. Mr. Smith maintains that "Mr. Schussler's reference to the Sandwich Islands is in connection with a pipe joint—not a pipe." Now as the joint described is used with plate iron or steel pipes only, (never with cast pipes) Mr. Smith must admit either that Mr. Schussler used joints without pipes, or else that the case cited is an instance of his having used plate pipes. Mr. Smith states that rivets are not included in his estimate. Mr. Schussler, who made the estimate, and therefore ought to know what it includes, states in so many words that "required allowance is made for rivets."

He basis—his estimates of the cost per pound of completed pipe (nine cents) on the number of pounds of iron in the pipe; now as the number of pounds of rivets is only a very small fraction of the total number of pounds of iron in the pipe, the proportional cost of rivets in one pound of iron would be only a fractional part of a cent; or in other words, estimating the cost of iron (2,096,160 pounds) at 3½ cents per pound, and the cost of rivets (70,000 pounds) at 7 cents per pound, the cost of rivets to every pound of iron would be only a fraction over two-tenths of a cent, whereas Mr. Smith seems to have an idea that the cost of rivets per pound of iron is 7 cents. It is obvious to any one who gives the matter one moment's consideration that there are not as many pounds of rivets as of iron pipe. Now rivets, mechanical work of making, rivetting, etc., pipe and making joint in ditch, are lumped together in the schedule, and amount to a total of 3.3 cents to every pound of pipe. In my letter of the 16th inst. among other instances cited (in which reference was made to rivetted plate pipes furnished by the Risdan Iron Works of S. F.) was 4¼ miles, thirty-one inches in diameter, for the Portland Waterworks Company. Mr. Smith asserts that the Portland waterworks are not even begun.

Now if Mr. Smith inquires into the matter he will find that the Portland waterworks have been in operation for years, and that they have been furnished with 4¼ miles of wrought iron pipes as before stated. It is further contemplated to construct works for the water supply of the city of Portland, which will include thirty-one miles of wrought iron pipe 27 and 22½ inches in diameter. The adoption of wrought iron pipes for this proposed work is conclusive evidence that the projectors consider that class of material preferable to cast iron. If Mr. Smith had informed himself regarding facts he would not have made such flat contradictions as those above referred to. After all, even supposing Mr. Schussler had not given an instance of the existence of similar pipes to those he recommends, and that rivets had been omitted from the estimate, the fact would still remain that Mr. Schussler's report on the nature and desirability of the material proposed, whether the pipes are adequate to the service proposed, and his estimate of cost of construction, are a complete endorsement of the designed works proposed to be constructed by the Coquitlam Waterworks Company, an endorsement which no competent and disinterested critic has attempted to question or gainsay.

Yours truly,
E. A. WILMOT.

VANCOUVER, May 25th, 1887.

TWENTY REASONS WHY

The By-Law Granting a Guarantee of 3 per Centum per Annum for 10 Years

On the First Mortgage Bonds of the Coquitlam Water Works Company

Should be Voted Down by the Electors of Vancouver on June 4th.

1st. Because the council, after voting down a motion to submit both the Capilano and Coquitlam Companies' schemes to the opinion of a competent hydraulic engineer, adopted the Coquitlam scheme, and then submitted it alone to Mr. Hermann Schussler, C. E. of San Francisco.

2d. Because the Company's actions throughout their dealings with the council and the people have been characterized by most unusual secrecy, inasmuch as they have been unwilling to give details of their scheme, or to show proper plans, and have repeatedly changed their proposals, the length of their system, and the elevation of their point of supply, so that up to the present date there is considerable doubt as to their actual intentions.

3d. Because the Company's first proposal to the council asked for a guarantee of 6 per cent, per annum for 20 years on \$500,000, equal to 3 per cent. per annum on \$1,000,000, and their final proposal, which was adopted, asked for 3 per cent. per annum for 10 years on \$280,000, being a total drop of nearly ¾ of a million dollars, from which it is evident they either asked for far too much in the former instance, or have accepted far too little in the latter.

4th. Because of the acknowledged length of their system, 20 miles to Heatley avenue, when an abundant supply of pure cold water can be readily obtained at less than half the cost from the Capilano river by a system only 9¼ miles to Carrall street, the centre of the city.

5th. Because of the character of the mains to be used, being thin, rivetted, sheet-iron or steel plates, liable to leak, and incapable of rough handling.

6th. Because the city cannot gain control of the works when desired, there being no purchasing clause in the company's charter or agreement with the city.

7th. Because the company's agreement guarantees only three miles of distributing pipes, which is totally insufficient for fire protection, and will not secure insurance, there being at the present date only 1½ miles of improved streets within the city, with a probability of only 15 miles in June, 1888, when the works are supposed to be completed.

8th. Because the water to be supplied is of questionable purity, as it is to be taken from a lake on a river, which is known to be much contaminated by decaying animal matter.

9th. Because the company give no privileges to the city in return for the guarantee, the eighth interest promised being of doubtful value and water for fire protection although nominally free, being in reality charged for at the rate of \$15 per annum for each and every hydrant.

10th. Because the pressure and discharge guaranteed by the company do not afford a sufficient fire protection for the higher levels of the city.

11th. Because the agreement confers no power on the corporation to designate where distribution pipes shall be laid, and therefore fire protection will be provided on such lines of pipes only as may be chosen by the company.

12th. Because the company being under no obligation to commence construction within a given time, may, through inability to float their bonds, be unable to commence at all, thus losing wholly a year's time and eventually placing the city under the necessity of making other arrangements.

13th. Because the city pledges its credit for the whole estimated cost \$280,000, and allows the company the privilege of tapping the mains at Port Moody and supplying its citizens at the expense of the people of Vancouver.

14th. Because the company having the privilege of tapping the mains wherever they may desire, a direct inducement is offered to manufacturers to locate outside the city limits to escape taxation.

15th. Because the company do not guarantee an independent system, thereby leaving the city liable to future complications with New Westminster, Port Moody and other cities.

16th. Because Vancouver merchants will derive no benefit from the expenditure on construction, Port Moody being the central point of their system, must necessarily receive the whole or greater part.

17th. Because the city has no power under the terms of the agreement to withdraw the guarantee, should the company on completion of the works, fail to provide a thoroughly efficient water and fire service.

18th. Because it can be shown, and is believed by the practical men of Vancouver that the works cannot be built in one year's time nor for the estimated cost of \$280,000, and that the city runs the risk, therefore, of being called on at a later date for further time and monetary assistance.

19th. Because the engineer's opinion, which caused the final adoption of the scheme, was confessedly not an opinion on the scheme, but an ideal estimate of the cost of 20 miles of 16-inch main in an ideal country.

20th. Because the Capilano company will construct their works at once, without any guarantee or aid from the corporation, and it would be manifestly unfair and prejudicial to the city's best interests to subsidize a rival company.

Vancouver, May 25th, 1887.

In another column appears an article giving twenty reasons why the by-law giving the guarantee of the City of Vancouver in behalf of the Coquitlam Water Works Company should be defeated by the electors. We think it desirable to refer to this article.

The NEWS-ADVERTISER, as is well known, opposed strongly the agreement as first proposed by this company, and in a great measure, by its opposition, was the arrangement so modified as to be much more favorable for the city's interests. The matter was then put before the people for their decision, and their vote will be taken on 4th June next. Meanwhile the columns of this paper have been open for the free discussion of the project by both its supporters and its opponents. Upon the merits of the enterprise itself, upon the advantages or disadvantages which it shows, as compared with other possible schemes, we have offered no opinion. When therefore the article which we print to-day was sent to us we felt obliged to decline it except as a paid advertisement, because in the form it is presented, and as it was not in reply to any correspondence which has appeared, it might have been taken as a representation of the views of this paper, which it is not, although the reasons set forth may be sound and unanswerable, because we do not consider the time has yet come for us to express an opinion.

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SKETCH PLAN

of

Water Supply for the City of Vancouver

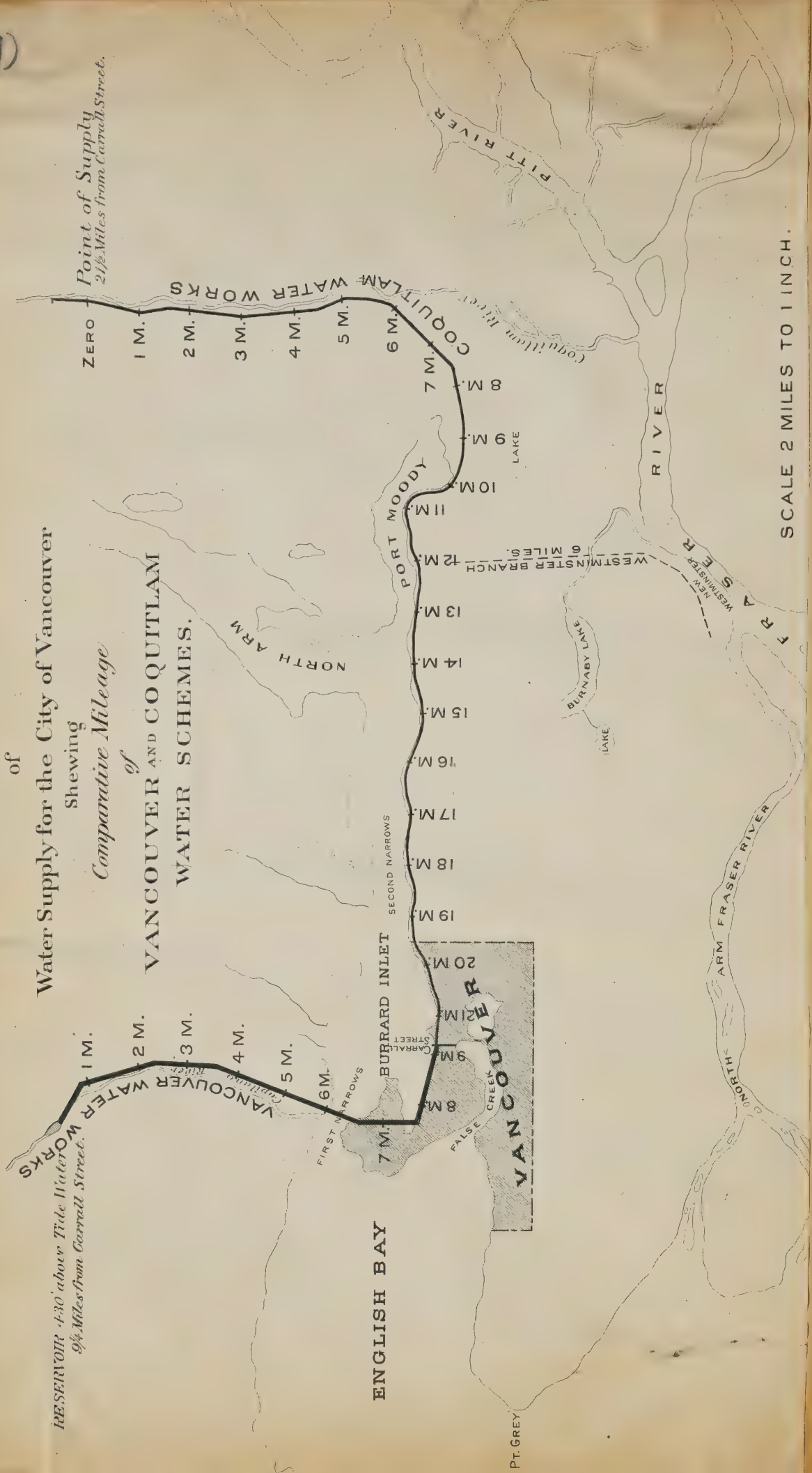
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Comparative Mileage

of

VANCOUVER AND COQUITLAM

WATER SCHEMES.



A CARD.

OFFICE OF VANCOUVER [CAPILANO]
WATER WORKS CO. (LIMITED.)

Vancouver, May 25th., 1887.

To the Electors of the City of Vancouver:
GENTLEMEN—I am authorized by the
Vancouver Water Works Co., to make
the following statements;—

1st. That this company is prepared to
supply the city with water from Capilano
Creek without any guarantee of interest
on their stock or bonds;

2ND That they will furnish the water
within one year from June 1st.

3RD That they will supply the city
with water for fire purposes and place
hydrants where directed along their line
of pipes, for which a charge of \$25 for
each and every hydrant per annum will
be made. (said \$25 to cover use of water
and hydrant for fire purposes.

4TH If the By-Law is defeated and the
City Council prefers it, our company will
supply the city with water as per its pro-
posal of March 14th 1887 with no varia-
tion therefrom except as to time limit
which shall mean that works are to be
completed within one year from June 1st.

5TH That they are prepared to give a
bond if required for the due performance
of above.

THE VANCOUVER WATER WORKS
CO., (LD.)

PER J. W. McFARLAND,
Secretary.

THE CAPILANO COMPANY.

The Engineer Here and Work to be Com-
menced at Once.

Captain Irving and Mr. George A.
Keefer, C.E., of Victoria, arrived in Van-
couver yesterday morning by the Yose-
mite. Knowing that both these gentlemen
are largely interested in the Capilano
waterworks company, a representative of
the NEWS-ADVERTISER obtained an inter-
view with these gentlemen to ascertain
what they had to say in regard to the in-
tentions of the company. Captain Irving
having to return to Victoria by the boat
yesterday afternoon, could not spare the
time to go fully into the details, but he
stated that it was the full intention of the
Capilano company not only to construct
their works but to commence operations
immediately, as he had already stated in
the telegram which he had sent from San
Francisco to Mr. McFarland, the secre-
tary of the company, and which has been
already published in our columns. He
said that if it would in any way confirm
the belief of the citizens of Vancouver in
the intentions of his company he was
himself prepared to deposit with the
council the sum of \$5,000 or a larger
amount as evidence of good faith in the
matter. He had to return to Victoria in the
afternoon but would be back in Van-
couver next week in company with Mr.
Rieth who is now in San Francisco and
who is largely interested in the company.
Captain Irving said he was perfectly
satisfied as to the future prospects of this
city, and felt assured that their scheme
would prove a remunerative one. They
are still, in the event of the proposed
agreement with the Coquitlam company
being voted down by the electors, pre-
pared to supply the city with water ac-
cording to their proposal of the 14th
March last, and will have the works in
operation by 1st June, 1888.

In an interview afterwards with Mr.
George A. Keefer, who is the engineer of
the company, that gentleman stated that
Mr. McFarland, their secretary, had gone
east yesterday to close the contract with
Mr. John F. Ward of Jersey city for the
laying of the two submerged mains across
the Inlet, that gentleman, as is well
known, having had a great deal of ex-
perience of work of that character. Mr.
Keefer remains here in order to make the
necessary surveys for the line of pipe on
the other side of the Inlet, and as soon as
he has completed this he will call for
tenders for the cleaning of the ground and
the grading of it for the line of pipe from
the source of supply to the shore of the In-
let. He expects to be able to call for
tenders for this work in about a week.

There appears, therefore, no doubt but
that the company intend to push the
work forward as rapidly as possible, and
this means the expenditure of large sums
of money and the employment of a num-
ber of men during the next few months.

A DENIAL.

The two following telegrams have been
handed to us by Mr. J. W. McFarland,
with the request that they be published.—
ED. NEWS-ADVERTISER.

VANCOUVER, B. C.,
25th May, 1887.

Thomas Earle, Victoria:

M. G. McLean circulating report that
you told him personally Capilano's offer
to build waterworks without guarantee is
only a bluff. Please answer at once. Im-
portant.

(Signed) J. W. McFARLAND.

ANSWER.

VICTORIA, B. C.
May 26th, 1887.

Jno. W. McFarland, Vancouver:

Report circulated by McLean that I
stated offer to build Capilano waterworks
without guarantee was a bluff, is an un-
mitigated falsehood. Never spoke to Mc-
Lean. Don't even know him.

(Signed) THOMAS EARLE.

CORRESPONDENCE.

The Waterworks Question.

To the Editor of the NEWS-ADVERTISER.

DEAR SIR—As a resident and taxpayer
of Vancouver I have read with a great
deal of interest the various articles which
have appeared in your paper during the
last few weeks.

Taking it for granted that when the
city council decided to adopt the Coquit-
lam scheme they did so after a most care-
ful and intelligent consideration of all
necessary details of both schemes before
them.

Now sir, whom are the Coquitlam Co.
dealing with, the ratepayers of this city
or the Capilano Co.? Judging from the
correspondence the ratepayers have noth-
ing at all to say about this matter which
is of such vital importance to us.

Whereas the rival company have a
complete monopoly, and either by fair
means or foul are trying their utmost to
defeat the bylaw.

It strikes me very forcibly that we have
plenty of non interested citizens who
might give expression to their views thro'
your valuable paper, and not leave what
is clearly their duty to the "tender mer-
cies" of a rival company.

Everyone knows the state of the drink-
ing water in the city at present, and can
readily guess what it will be like in the
course of a month or so. It is scarcely
necessary to urge upon every citizen the
importance of having an abundant supply
of pure water at the earliest possible time.

Should the bylaw be defeated it simply
means an indefinite amount of time wast-
ed, and I for one have no faith whatever
in the (last) proposal of the Capilano Co.

Yours respectively,

A TAXPAYER.

Vancouver, May 26, 1887.

TWENTY REASONS WHY

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On the First Mortgage Bonds of the Coquitlam Water Works Company
Should Be Voted Down by the Electors of Vancouver on June 4th.

1st. Because the council, after voting down a motion to submit both the Capilano and Coquitlam Companies' schemes to the opinion of a competent hydraulic engineer, adopted the Coquitlam scheme, and then submitted it alone to Mr. Hermann Schussler, C. E. of San Francisco.

2d. Because the Company's actions throughout their dealings with the council and the people have been characterized by most unusual secrecy, inasmuch as they have been unwilling to give details of their scheme, or to show proper plans, and have repeatedly changed their proposals, the length of their system, and the elevation of their point of supply, so that up to the present date there is considerable doubt as to their actual intentions.

3d. Because the Company's first proposal to the council asked for a guarantee of 6 per cent. per annum for 20 years on \$500,000, equal to 3 per cent. per annum on \$1,000,000, and their final proposal, which was adopted, asked for 3 per cent. per annum for 10 years on \$281,000, being a total drop of nearly $\frac{3}{4}$ of a million dollars, from which it is evident they either asked for far too much in the former instance, or have accepted far too little in the latter.

4th. Because of the acknowledged length of their system, 20 miles to Heatley avenue, when an abundant supply of pure cold water can be readily obtained at less than half the cost from the Capilano river by a system only 9 $\frac{1}{4}$ miles to Carrall's reef, the centre of the city.

5th. Because of the character of the mains to be used, being thin, rivetted, sheet-iron or steel plates, liable to leak, and incapable of rough handling.

6th. Because the city cannot gain control of the works when desired, there being no purchasing clause in the company's charter or agreement with the city.

7th. Because the company's agreement guarantees only three miles of distributing pipes, which is totally insufficient for fire protection, and will not secure insurance, there being at the present date 7 $\frac{1}{2}$ miles of improved streets within the city, with a probability of there being 15 miles in June, 1888, when the works are supposed to be completed.

8th. Because the water to be supplied is of questionable purity, as it is to be taken from a lake on a river, which is known to be much contaminated by decaying animal matter.

9th. Because the company give no privileges to the city in return for the guarantee, the eighth interest promised being of doubtful value and water for fire protection although nominally free, being in reality charged for at the rate of \$15 per annum for each and every hydrant.

10th. Because the pressure and dis-

charge guaranteed by the company do not afford a sufficient fire protection for the higher levels of the city.

11th. Because the agreement confers no power on the corporation to designate where distribution pipes shall be laid, and therefore fire protection will be provided on such lines of pipes only as may be chosen by the company.

12th. Because the company being under no obligation to commence construction within a given time, may, through inability to float their bonds, be unable to commence at all, thus losing wholly a year's time and eventually placing the city under the necessity of making other arrangements.

13th. Because the city pledges its credit for the whole estimated cost \$281,000, and allows the company the privilege of tapping the mains at Port Moody and supplying its citizens at the expense of the people of Vancouver.

14th. Because the company having the privilege of tapping the mains wherever they may desire, a direct inducement is offered to manufacturers to locate outside the city limits to escape taxation.

15th. Because the company do not guarantee an independent system, thereby leaving the city liable to future complications with New Westminster, Port Moody and other cities.

16th. Because Vancouver merchants will derive no benefit from the expenditure on construction, Port Moody being the central point of their system, must necessarily receive the whole or greater part.

17th. Because the city has no power under the terms of the agreement to withdraw the guarantee, should the company on completion of the works, fail to provide a thoroughly efficient water and fire service.

18th. Because it can be shown, and is believed by the practical men of Vancouver that the works cannot be built in one year's time nor for the estimated cost of \$281,000, and that the city runs the risk, therefore, of being called on at a later date for further time and monetary assistance.

19th. Because the engineer's opinion, which caused the final adoption of the scheme, was confessedly not an opinion on the scheme, but an ideal estimate of the cost of 20 miles of 16-inch main in an ideal country.

20th. Because the Capilano company will construct their works at once without any guarantee or aid from the corporation, and it would be manifestly unfair and prejudicial to the city's best interests to subsidize a rival company.

Vancouver, May 25th, 1887.

FRIDAY, MAY 27, 1887.

THE WATER WORKS AGAIN.

Just think of it! Twenty reasons why the by-law granting a guarantee on the bonds of the Coquitlam Water Works Company should not be adopted. That ought to sink the concern if there is any sink to it or else the twenty reasons have very little weight in them. Some of them are very attenuated and others are no reasons at all, and what is more, the writer has not the courage of his conviction and permits his twenty reasons to sink or swim without any of the moral support which a man with so many reasons depending upon him ought always to be ready to give to such an interesting progeny. A very cursory glance at this labored production will show that the author takes a very narrow view of the water works question. In fact he only sees it from a Capilano standpoint. A counsellor with this limited view of the question and a selfish object would not be a very safe guide to follow.

His first reason is really no reason at all. In it he complains of the Council voting down a motion to submit both schemes, adopting the Coquitlam and submitting it alone to a competent engineer. The reason for the Council's action is not fair to seek. It felt itself competent to make a selection between the two schemes, other things being equal or nearly so. It did not ask Mr. Schussler to make a selection, that it had done; but it asked him to say whether the amount named as the cost of construction was sufficient and whether the material proposed to be used was suitable. It is generally supposed that the Council, in making the selection, was acting within its powers and with the exception of those interested in the Capilano Company, it will be admitted that the Council believed that the scheme it adopted was the best for the city. It is, without dispute, the safest, and no council has a right to make experiments in water supply with the funds of the corporation under such circumstances. What then does the first of the twenty reasons amount to? Nothing at all, and even less than nothing; for it shows that the Council adopted what it knew to be a safe project and that is the right course for every public body to take.

The second reason is hardly worth noticing. It simply means that the Coquitlam company should have told the projectors of the other scheme all they knew about water works construction, given them the details, the cost of construction, the material to be used, in fact everything they wanted. That would have been very accommodating and very desirable probably, but it would hardly have been business as business is conducted in these days. It would be very like a partnership without the profits. The Council had no difficulty of obtaining all the information it desired or was entitled to, but contractors generally do not put their prices of contract work on bill boards, or send them to a rival contractor. The lamb-like simplicity of the man with the twenty reasons is very refreshing.

The third reason has reference to the reduction made in its offer by the Co-

quitlam Company. This is explained by the company in this way. That the works as originally estimated upon was on a more extensive scale. That is all very well, but we think that the city was fortunate in having two companies desirous of supplying the city with water. Had there only been one, so favorable a decision would, in all likelihood, not have been secured. But it is no reason why the city should not take the best terms offered, other things considered.

The fourth reason is the length of the Coquitlam system. There would be some force in this were it not for the difficulty in crossing the narrows. Engineers may say what they like about it, but common sense tells one the danger is there, and the company has, in effect, admitted it by proposing to construct a reservoir on this side of the narrows so that a supply of water may be provided in case of accident. As already said, the safe road is the best even if it is the longest.

The fifth reason deals with one of the questions submitted to Mr. Schussler by the Council, namely: The character of the mains; and it is just possible that the citizens generally will prefer the practical opinion of a man of his standing to the Unknown with his twenty reasons.

The sixth has reference to the purchase of the works by the city hereafter. When the time comes for the consideration of that question the city will probably find it cheaper to construct new water works than buy old ones at the rate stated in the Capilano Company's proposition.

The seventh reason has reference to distribution. We suppose water companies are like most other companies, and want to do as much business as possible, thereby increasing their profits. Unless the law of supply and demand is reversed in their case the public need have no fear about the terms of the company's agreement with the Council in this regard.

The eighth reason respecting the purity of the water is a question that ought to be easily settled. If there was any valid reason for calling its purity in question the gentleman with the score of reasons would certainly have had some indubitable evidence to produce of the truth of his statement but he contents himself with the remark that it is of "questionable purity." So far as the evidence is concerned he is the only person that questions the purity of the source of supply, but he has taken no steps to prove it.

The ninth refers to an eighth interest promised to the city by the company, but, like the source of water supply, it is, according to this authority, of "doubtful value." Well, whatever may be its value the public will not look to this source for its facts. It is a contemptible remark and proves that the source from which it comes is not beneath taking a mean advantage. It is not the city's interest that the author of a score of reasons is anxious about, but the success of a rival company. From the course which its advocate has pursued in the discussion of the water question, the citizens can form some idea of the treatment they might expect to receive should they be forced to fall back upon it for their water supply. More anon.

From the statements of Captain Irving and Mr. George A. Keeter, and the card from Mr. McFarland, it appears now certain that the Capilano Company intend constructing their works for supplying the city with water from across the Inlet.

To Vancouver a good supply of pure water for drinking and domestic purposes, and also for fire protection, is probably the thing most important, if our growth and prosperity are to continue. The council have realized this and have done their best to get the need supplied. Of the two propositions put before them last March, they chose that of the Coquitlam Company in preference to the one made by the Capilano Company. Both companies asked for a guarantee by the city of their bonds, and when the final propositions were made there was not really much difference in the financial schemes of the two companies. Of the subsequent history of the negotiations with the Coquitlam Company our readers are too well acquainted for it to be necessary for us to mention them here.

On the fourth of June the electors will decide whether the agreement with the Coquitlam Company shall be confirmed. A week or two ago it seemed as if there could be no doubt but that it would be desirable for the city to have this company supply the water on the terms proposed. But a change has suddenly come in the condition of affairs. The Capilano Company announced their intention of building their works even though the city give them no financial aid by guarantee or otherwise. They made the announcement certainly in a business, and apparently in a straightforward, manner. And it is for the citizens also to look at it in a cool and deliberate way.

It appears to us that there are only two questions to ask, and if these can be answered to our satisfaction, our course appears to be plain. To the first question: Would it be desirable for the city to assume any liability if it can get what it requires without? there can be but one answer, and that in the negative. To the next question: As to whether the city can get a water supply without any liability? the announcement by the Capilano company seems to supply an equally clear answer in the affirmative. If these two propositions can be answered in no other way, and we do not think they can, then under the new circumstances there is apparently no other course open for the voters on the fourth of June, if they consult the permanent interests of Vancouver but to defeat the by-law.

We are aware that there are many side issues and some other points that require explanation. But we propose to-day to merely put these two propositions before readers clear of everything else. These other matters we will deal with on another day, merely remarking now that upon careful consideration they will be found to present nothing which really conflicts with the answers to these two propositions.

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[Copy of Letter from John F. Ward, Esq., C.E., Late Chief Engineer, Jersey City Water Works,
Inventor and Patentee of the "Ward Flexible Joint Pipe," Re Stability of Submerged Mains.]

291 MONTGOMERY ST., JERSEY CITY,)
February 10th, 1887.)

G. A. KEEFER, ESQ., C.E.:

DEAR SIR,—I am in receipt of your letter inclosing printed account of arguments before the Council in regard to submerged pipe in the Narrows.

The objection as to danger of corrosion in salt water has no force, as is shown by numbers of syphons at bridges in the vicinity of Boston, also on the Jersey City Water Works. These were put down without any coating of pitch, and have—many of them—been exposed between high and low tide to very salt water for over twenty-five years.

As to there being current enough in the Narrows to move the pipe, my experience shows that there is not, and to explain I will cite a few cases: More than twenty years ago I laid a six-inch pipe in the Delaware River at Easton, Pa., which has been in constant use ever since without accident, and in that time there have been many freshets in the River, rising over thirty feet above low water, making a stream with which the Narrows would hardly compare for fury, and still this little pipe continued peacefully to supply the town on the other bank with pure and wholesome water."

In 1870 I laid two lines of 8-inch pipe across Shirley Gut, in Boston Harbor, in a very rapid tidal current and very salt water, which, at last advices, were in constant use.

In 1874 a 12-inch pipe was laid by me at Lawrence, Mass., above the large dam there, and in such position that a freshet soon after scoured the sand from under it for a space of 60 feet in length, deep enough to allow a diver to walk under it, and the pipe continued in good condition, and so remains to this day. No account has come to me of the filling up of the scour, but presumably it is a matter of no great consequence whether the pipe hangs in the swift current or is covered up with sand and gravel.

I yesterday cabled an order to Scotland for nearly one mile of 12-inch pipe of the same pattern as that I offered you, which my contract requires to be laid across a river in South America, where the British Admiralty chart gives the spring rise of tide as 11 feet, and the parties ordering acknowledge to a current of 12 miles per hour. This job will be done by me in the autumn of this year, and, when laid, the current will have no effect on the pipe to move it, or to scour even the varnish off of it.

No trouble need be feared from shipping grounding on the pipe, as it is too thick to be crushed by any weight of that kind; and, if any vessel catches it with her anchor, she will have to wait the turn of the tide to clear herself, as they sometimes do in Boston harbor when they foul on a submerged pipe.

It pleases me to hear that you propose to duplicate your submerged pipe, as it would be a pleasant thing for me to face the dangers of the "Narrows" twice for money, in case you should conclude to make a contract with me for the work.

Yours truly,

JOHN F. WARD.

(1887)

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giving

Correspondence.

Water Works.

To the Editor of the Herald.

SIR,—In the News-Advertiser of the 15th there appears a letter embodying a telegram from Capt John Irving, with respect to which, and also to the editorial comments of the News thereon, we here offer a few remarks.

The reading and publication of this telegram is, no doubt, intended to influence votes upon the Coquitlam By-law, and, if possible to defeat it.

This By-law has been carefully prepared by the city solicitor, and the agreement to which it is designed to give effect, has, after very full discussion and consideration, been adopted by the City Council, as one under which the city obtains an advantageous bargain.

It would be the height of folly for our citizens by casting an adverse vote upon or neglecting to vote for the Coquitlam By-law, to allow it to be defeated, and the agreement with the Coquitlam Company to fall to the ground.

Under this agreement, as we understand it, the city, in consideration of their guarantee of \$8400 per annum for ten years obtains in perpetuity a service of which the actual commercial value, as shown by reliable statistics, is rather over one half of one per cent of the total value of insurable property protected by the proposed works. By the time these works can be placed in operation this value will probably amount to say three million dollars of which $\frac{1}{2}$ of 1 of 1 per cent would be \$15,000.

But the city is also indemnified for any possible payment that it may be called upon to make under its guarantee by a clause in the agreement with the Company giving it, the city, a lien on the revenues of the proposed works; so that actually, any pay to make good its guarantee would simply be temporary advance to be refunded and the city naturally will get the benefit of the protection offered by the Company's works—a benefit worth as we have shown at least \$15,000 per annum at the outset—secured to them in perpetuity in return for nothing at all beyond the cost of the ink used by the Mayor and Treasurer in signing the Company's bond. This alone would seem to be a sufficient preponderance of advantage on the side of the city to ensure the polling of a solid vote by the citizens in favor of the By-law. But, in addition to this, the Company has agreed to give the city an eighth of the profits accruing upon the operation of the works in the city. We are decidedly of the opinion that the city will never again have the opportunity of concluding such an advantageous arrangement for water supply.

In making the existing agreement between the Coquitlam Company and the Corporation, the latter had the benefit of there being two competing Companies and was thus in a position to make far more favorable terms than could otherwise be obtained.

In the event of the By-law being defeated and the Coquitlam Co. retiring, the city would have to submit to whatever terms the Capilano Co. might dictate. It has already taken the Council four months to arrive at its present decision, and as "Aquarius" states, and Mr. McFarland of the Capilano Co. admits, the city's interests are unusually well guarded. What more does the city want? The defeat of this By-law, if it causes the withdrawal of the Coquitlam Company, will lead to one of the following results.

1st. Either the Capilano Company will proceed without any guarantee or agreement with the city, (in which case it will construct works of such efficiency only as it chooses, and will be in a position to demand from the city an annual cash payment for fire protection furnished to the full extent the law allows.)

2nd. Or the city and the Company will enter into an agreement which will certainly entail further delay and as certainly (from the fact of there being no competition) will result in a less advantageous bargain for the city than that now obtained.

Mr. Smith considers that the upper surface of the pipe should be at least three feet under ground in order to be safe from the action of frost. Such a statement is a calumny on our climate and we would ask Mr. Smith if he can give authentic evidence of frost having penetrated one foot into the ground in this part of the Pacific Slope.

On the one hand we have the independent opinion of an engineer who has made hydraulic engineering a specialty for more than twenty years, and whose reputation in that particular branch stands second to none in this continent.

On the other hand we have the opinion of Mr. H. B. Smith of whose experience in water works engineering we have yet to hear, excepting in connection with the survey for the Capilano Co.

CORRESPONDENCE.

Still Another Denial.

To the Editor of the News-Advertiser.

In reference to the telegram signed by J. W. McFarland, in regard to myself, published in your paper of this morning, (27th), I deny every word of it; never made use of any such language, and I do not know Thos. Earle.
27th May, 1887. M. G. McLEAN.

The Coquitlam Water Works Co.

To the Editor of the News-Advertiser.

From Mr. E. A. Wilmot's letter of May 23d, it is perfectly evident that he has no intention of being convinced by arguments or facts, and I shall desist from the profitless attempt of trying to do so. However, I repeat that my remarks on Mr. Schussler's letter of April 27th have not been retuted in a single instance by Mr. Wilmot or any one else. I beg to refer those who may be interested in the one point particularized by Mr. Wilmot, viz. rivets, to Mr. Schussler's letter, wherein that gentleman, after having said, "In the following estimate, etc., etc., required allowance is made for rivets, mechanical work, etc.," also says: "I assume price of iron at 3.5 cents and rivets at 7 cents." He then tabulates his items as follows:

Iron, per pound.....	3.5 cts.
Rivets, per pound, 7 cts....	
Mechanical work of making, rivetting, etc.; pipe, and making joints in ditch.....	3.3 cts.
Coating, hauling, ditching, fitting, etc., as above.....	2.0 cts.
Allowance for contingent expenses.....	0.2 cts.
Total.....	9.0 cts. per lb

By what process of reasoning Mr. Wilmot arrives at the conclusion that any allowance for rivets is made in this total of 9 cents per lb., I am at a loss to understand.

It is quite within the bounds of possibility that Mr. Wilmot's desire for a competent and disinterested engineer to dare criticising Mr. Schussler's letter will be gratified.

Your obedient servant,
HENRY B. SMITH.
Vancouver, May 27th, 1887.

VOTERS' LIST

Persons Entitled to Vote on By-laws Nos. 12
and 13 Having Property to the Value
of \$500.00

A Abbott, Henry August, Rich B August, James Alexander, Rich H Authier, Napoleon Allan, G L Aloock, Mrs	D Day, Rauben Dearden, G A Deighton Derjardines, Gideon Devlin, J C Donohoe, Thomas Douglas, Ben Lunn, Thomas Dupont, C L Duffy, Horatio J Dougall, John Douglass, J C D'Herbomez, Bishop Desental, R G Davis, Jonathan Dun-muir, Robert	H Hall, W D Hargreaves, Walter Harrison, H A Horne, J W Harrington, E B Harris, D R Hemlow, Henry Haley, E B Hickey, Patrick Hill, J B Hiney, William Holman, H G Hogan, David Harrison, Dr Hawkins, John	Mc McCraney, Hiram P McCaskery, Geo McGillivray, D McNair, David Major, Obas G Matthew, Thos Merzer, Henry G Morton, John Mosler, Albert Martin, William Mannion, Jos Mathison, Robert Miller, Jonathan Mole, Henry Monat, Mrs Merrill, Thos M Muir, Andrew C Muir, John N Munroe, John Muntrie, Henry Marle, John A Milne, G L Mulligan, J	R Ross, A W Rothschild, M A Reosbeck, A
B Baker, E Crow Beasley, Alex O Butler, O Byrnes, George Black, George Black, Mrs A S Bighouse, Sam Brown, E Brown, William Barker, E E Baldwin, Geo O Balfour, Robt Boyd Thos H Barnard Frank S Boncher, F D Bodwell, E V Bowron, J Brewer, W J Blair, Wm S	E Edmonds, Henry V Evans, David Eharts, D M Eligh, Hamilton	I Innes, F C Irving, John Irving, H Bell	N Nelson, W P Nicholson, John Northcott, Jos R Newlands, John	S Sinclair, Thos F Smith, Sir D A Smith, James G Springer, Ben Spratt, Joseph Sterling, John W Stoullar, E S Simpson, Theo Sorby, Thos C Souls, William Sorbin, John Spalding, S C Stewart, John M Sullivan, A W Struthers, Alex Spring, T B Steele, Peter Saunders, Edwin Snowden, N P Smith, T A B Smith, Hon Wm Spinks, John M Stevens, Sir Geo Stephenson, Russel
C Campbell, W D Chase, R J Chase, Henry Clarkson, Jos Collier, A T Corbould, Gordon F Carcy, Patrick Carter, Louis Charleson, D B Coldwell, Chas A Condell, Thos H Cordier, Peter Corgrove, Edmund Crichton, Wm Cyrus, Thos D Campbell, M L Callister, John Clark, Robert Clarendine, Jas Cannichael, E B Cartwright, John Chibolm, D B Costello, Michael Coffer, Mrs M A Coughtry, Alred R Carr, Richard	F Ferguson, A G Flaming, W G Frazer, Simon Fairon, Afonse Fovor, J H Fether, Thomas Frost, H O	J Johnson, Lucy R Jones, Henry A Johnson, Alex James, Thos John	O Oppenheimer, David Oppenheimer, Isaac Otton, Joseph O'Reilly, P	T Tait, Thomas Tolcott, E W Tatlow, R G Turner, George Todd, J H Tottie Templeton, Wm Turnbull, Thos
G Gravely, Walter E Gray, Thomas Gilmore, Alexander Gola, Louis Grant, Robert Griffith, Joseph Gillis, J A Goepel, W J Gray, David G Gannou, Pat Grant, Cyrus	M McDonald, Thos McEwen, Hugh McArthur, James McColl, A J McFaughton, D McGregor, John McKendry, Edward McPherson, Duncan McPhee, Edward McFarland Jos W McGhill, Jas McLennan, R P McPheely, E J McWhinnie, Thos	K Kiney, W T Kemp, Jas A Keefer, Geo A Kent, Wm O Keddy, William	P Piggott, James Porter, Luke A Powell, Israel W Power, William Prevort, J C Pearsall, Thos W Pleace, J H Peck, Elias G Percival, W W	V Vernon, F G
H Hailstone, Wm Hall, Rev Joseph Hamilton, Geo Hamilton L A Harris, Geo B Hannafin, James Holman, Andrew Hayden, J H Humphries, Joseph	L Lefevre, John Low, John E Lovell, John B Low, John H Lockerby, Geo H Leamy, James Lipsett, Robert	M	R Reid, James Robertson, Gideon Robson, Daniel J Robson, Hon John Rowlands, Thos Ruckle, Henry Rees, Griffith Roberts, B B Robichan, M C Rosner, Henry Rowling, Wm	W Wilson, James Watson, W Watson, Coverdale Watson, W B Wett, Leonard Wright, Alfred Wright, G B Wright, G H Wright, J G Webster, John Whipple, Thos Wilson, W B Wilson, Mrs B H

ERRATUM.

Abrams, John
Chas. Robert
Levy, Louis

Abrams, James
Chas. Robert
McKee, Angus

Philv, John
Edwards, L
Monat, Thos

Reid, F
Edwards, R

LETTER WRITERS.

Contributions and Suggestions on
Matters of Interest to the
Public Generally.

The Waterworks Question—Reading Room and Library—City Council Sectionalism.

Queries as to the Capilano Company's
Card.

To the Editor of the NEWS-ADVERTISER.

SIR—In the card published by the Capilano Waterworks Co., the following statements are made:

"1st. That the company is prepared to supply water from the Capilano Creek without any guarantee of interest on the stock or bonds."

Query. Why did they not make that proposition when they were asked to submit their final proposal?

"2. That they will furnish the water within one year from June 1st."

Query. Why, when they made their final proposal (and when they might have been taken at their word) was eighteen months named as the time limit?

3rd. "That they will supply the city with water for fire purposes, and place hydrants where directed along their line of pipes for a charge of \$25 to cover use of water and hydrants for fire purposes."

Query. What possible advantage would the city derive by giving the Capilano Company \$25 a year for hydrants, when according to its present agreement with the Coquitlam Company it is to pay only an annual rental of \$15, especially as the capacity of the proposed works of the latter company is much greater than that of the former?

"4th. If the bylaw is defeated and the city council prefer it our company will supply the city with water, as per its proposal of March 14th, 1887, with no variation therefrom, except as to time limit, which shall mean that the works are to be completed within one year from June 1st."

A query. As the council fully considered their proposal of March 14th in all its bearings, and rejected it in favor of the proposal of the Coquitlam Company, and has spent considerable time in framing an agreement in every way satisfactory to the city, why should the council prefer now to adopt the former proposal (and thus entail a still further loss of time in arriving at an agreement), especially by doing so they would be obliged to pay a higher price and receive less water?

5th. That they are prepared to give a bond if required for the due performance of the above.

Query—Knowing that the council cannot entertain any proposal relative to water supply, or accept any bond in connection therewith, until the present agreement submitted for the ratification of the ratepayers is disposed of, does it not look very like a blind to influence confiding voters their making such a proposal. If they had not made the offer to put up a bond which they know the council can not possibly accept, people might have thought that their offer was made in good faith, and that their flourish of trumpets in starting surveys, meant business, and that Mr. McFarland's trip east was to close the contract with Mr. John F. Ward, as well as to obtain goods for Keefer's supply store.

Yours truly, COGITATOR.

SUNDAY MORNING, MAY 29, 1887.

We should think that the parties interested in the Coquitlam Waterworks Co. would be considerably annoyed at the arguments which some persons are using in their behalf. It was an old criminal lawyer who once gave the advice to a young barrister just commencing practice: "When you have no case abuse the lawyer on the other side," and we think these advocates of the Coquitlam Company are following this advice. Unfortunately for them, however, their client's case was already before the voters, who will be the jury who will decide the case, before this plan was adopted, as the company had already made out the best statement they could, and it cannot now be withdrawn. They put forward the thickness of iron they would use, and if upon examination practical men agree that it is not such as it is desirable to use for this particular work they cannot now increase the weight. They agreed to leave the decision as to their estimates to a certain engineer, and now if it be proved that he has made serious errors and miscalculations they cannot change their proposal, and say he after all was not such an authority as they had supposed. They have made a positive statement as to the length of the line and if it be proved that it considerably exceeds that, they cannot accept the correction without difficulty because their figures would all be disturbed. They have claimed that the consumers can compel them to furnish water to them at the price fixed even if they do not live in the small area over which their service system extends, and therefore if it be proved by their charter that a consumer cannot do this unless he is prepared himself to advance the cost of constructing the pipe, they must admit that they made an erroneous statement.

Another very foolish error into which these enthusiastic, though injudicious, advocates fall is that they seem to assume that anyone who ventures to criticise or question any of the statements of the Coquitlam Company, must necessarily be an advocate of the Capilano Company.

Altogether we fancy the parties really interested in the Coquitlam Company will begin soon to cry that they may be saved from their friends.

SOME people seem to believe, or at least they choose to make statements which seem to imply it, that if the bylaw guaranteeing the Coquitlam Company's interest be defeated, it means that this company will not construct their works. But we see no reason why this should necessarily follow. The promoters of the company number amongst them shrewd business men who are going into the matter not for the city's benefit primarily, but because they think there is a considerable sum to be made out of the speculation. And we think there is no doubt of this. At the same time the carrying out of the scheme will supply Vancouver with water, and therefore were this the only means of securing that supply we would still advise the city giving its guarantee.

But now that the Capilano Company has come forward and stated that it will build its works without guarantee, we can see no reason why the taxpayers should take upon themselves any responsibility in order to allow either one company or the other to make a good speculation. We agree with our correspondent, Mr. Wilmot, that the council cannot now receive any deposit from the Capilano Company by way of forfeit, because at present the council has no official cognizance of either the company or its proposal. And we also think the public sentiment that the Capilano Company coming forward again at the eleventh hour should give some substantial and tangible proof of the *bona fide* character of its proposal is right, and we should think that they would not find it difficult to do this in such a way as would be satisfactory to the people. The Coquitlam Co. cannot really make any grievance out of the change in public sentiment with regard to their proposal, because they must remember that the agreement as finally accepted by the council, was only wrung out of them with much difficulty, and was marked at each turn in the screw by the exclamation of their attorney that there was nothing left in the proposal worth their undertaking. And yet the officers of the company, including the learned gentleman himself, seem so well pleased with what was left to them, that any possibility of their losing these remnants appears to fill them with anguish. And, therefore, we doubt not that if the by-law be defeated we shall yet see this company again come to the surface serenely and commence work with as much energy as they have displayed in the canvas of the voters though with much more judgment and we trust with success.

The Waterworks Question.

To the Editor of the News-Advertiser.

SIR—Certain comments that have been made in your columns upon the arrangement for water supply now awaiting ratification by the electors, are designed, it seems to me, to convey the impression that by defeating the Coquitlam guarantee bylaw the citizens would be escaping an arrangement under which they would have to pay a formidable impost for their water service, and at the same time would be securing a more favorable one whereby a supply would be assured to the city without any responsibility being undertaken by it.

It appears to us that the exact reverse of this is really the case.

Under the agreement with the Coquitlam Company the city secures its fire protection service *free*, whereas if that agreement should be voted down the next one would have to be negotiated with a company that asserts its ability and determination to construct its works independently of municipal aid, and that would therefore, in the event of its so constructing them, assuredly maintain its independence when it came to impose a fire protection rate. There is nothing in its charter to limit its charges for this service and it is a service that the city must have cost what it may.

There may be some citizens who have not a very definite idea of what this "fire protection service" is and what it represents; and it may assist any such to form a clearer idea of the relative importance of these two independent functions of a water supply system—namely, the delivery of a sufficient supply for domestic consumption and the delivery, when required, under high pressure, of a supply sufficient to drown out a fire—to remind them that a pipe having a capacity of discharge of thirty-seven cubic feet of water per minute would supply the draught for domestic purposes of five thousand people at sixty gallons per head per day; while to meet a possible fire drought the Coquitlam Company's main pipe is given five and a half times this capacity, or two hundred cubic feet of water per minute.

This is the present provision made by the Coquitlam Company for fire protection, and it is the benefit of the additional expenditure necessary to give their works five and a half times the capacity that would be adequate to supply the city's domestic consumption alone, that the city gets under its agreement with the Coquitlam Company in exchange for the use of its credit.

Should it come to negotiate a new arrangement the terms will probably embrace an exchange, not of the city's credit but of its cash, for this essential service of protection from fire.

The lien on the company's revenues given the city affords full and ample security against its guarantee ever having to be made good with a single dollar in cash; and it is a pity, I think, that your influential journal by casting doubts directly or by implication, upon this; should advertise to the world a distrust in the future of this city. A revenue of less than \$17,000 per annum over working expenses, which at lowest rates would be contributed by a population of a little over five thousand, will suffice to meet the company's exemption from liability under its guarantee. And it will be strange indeed, if, while the water works revenue of the little city of Victoria with a white population of eight thousand foots up forty thousand dollars per annum, that of Vancouver should fall short half of that sum.

Yours Respectfully,

C. W. W.

OUR correspondent, C. W. W., whose letter we publish to-day, has, we think, rather overstated his case as regards the Coquitlam Company, and proved a little too much. In the first place if this company can earn the amount which our correspondent says in a short time—and we do not at all dispute his sanguine ideas—it will not be requisite to have the city's guarantee, because capitalists from experience of similar undertakings can judge of the future of such a company as well as any one. Besides it is tolerably certain that they would rather have the company free from any lien on its receipts, and also without one-eighth of its profits being assigned to the city. The shareholders, also, will be in a much more advantageous position than if the city has such a large proportion of its profits.

And as regards the Capilano Co. our correspondent has altogether overlooked the fact that the city will always have the means of putting a check upon it should it be too exorbitant in its demands upon the corporation by reason of the power which the company is willing to give the city as to buying it up. Our correspondent seems to forget that really the corporation has no more hold upon the Coquitlam Co. at present than it has upon the Capilano Co. In either case it is only a promise of the two companies, and for any one to make insinuations as to the sincerity of the Capilano Co. is only to lay himself open to the retort *tu quoque*.

But the good case which our correspondent makes out for any company supplying Vancouver with water will, we fancy, incline the voters still more than ever to insist upon either waterworks belonging to the city, or built by a company which will give the city the option of purchase on reasonable terms.

CORRESPONDENCE.

Mr. McFarland's Eastern Trip.

To the Editor of News-Advertiser.

SIR—In your issue of yesterday there appeared a letter from a gentleman signing himself "Cogitator." The style of the letter is remarkably similar to that of several letters which have lately appeared in your columns signed by the chairman of the Coquitlam Waterworks Company. If so, the company appear to have suddenly reconsidered their ideas as to writing over their own signatures. But be the author whom he may I am authorized to state that the insinuation (so carefully worded as to read like an authentic statement) that the object of Mr. J. W. McFarland's visit to the east was to purchase goods for Mr. H. F. Keefer's supply store as utterly without foundation and has its origin only in "Cogitator's" or some equally interested individual's brain.

Mr. H. F. Keefer is entirely unconnected with the Capilano Waterworks Company, and the purchase of supplies for him is no part whatever of Mr. McFarland's business in the east, the principal object being the closing of the contract with Mr. John F. Ward for crossing the Capilano Company's mains over the inlet.

Your obedient servant,

HENRY B. SMITH,

Acting Secretary V. W. W. Co.

From the Reporter's Note Book—
Remarks which Were Dotted
Down Here and There

And are Reproduced in the Form
of Interviews Which Hug
the Truth

Anent the Seething, not Burning,
Question of a City Water-
works System.

Letter after letter has been written and column after column has been published respecting the momentous question of a waterworks system for this city. The prolific supply of *pros* and *cons* has grown as only rival stock companies indulging in a controversy and fighting for each other's scalp know how to make them grow, but aside from this the wind, the wisdom, the facts and the figures that have been fired at the head of a defenseless public in private, in public, in quiet places, and on street corners would fill a volume which for bulk would make Webster's unabridged hide its head in shame. In other words the whole matter has been pretty fully ventilated from technical, professional or personal or interested standpoints, and it only remains to give a glimpse of street opinion and this is best done by interviews with individuals without names.

Our first man interviewed is as well known as the chief of police and he is a Coquitlam advocate. He believes in that scheme with a fervency that alone should win success. When asked about the 3 per cent. city guarantee cut off of the Capilano Co., he waved it off with a gesture and said sententiously the Coquitlam Company's offer had been accepted and the matter was settled. The by-law would be passed and the company would float their bonds and go ahead with their work.

The second man who represents this interview was Capilano to the back bone. He said his company had been business-like throughout. They certainly made a slight concession in their second proposition by cutting down their contingency estimate but they knew upon the best authority the works could be completed at the price, and to back that opinion they were willing to go ahead without a guarantee from the city. In answer to the question "Why did you not offer this at first?" he said the company would be very glad to have a 3 per cent. guarantee to finance upon, if necessary, but at the same time they could finance without it, and were prepared to put up a forfeit as an earnest of their intentions.

Number three is the man who thinks the Capilano company has no business to interfere and is sentimental about the whole question.

Number four thinks both companies have been "monkeying" with the city council and that the by-law should be defeated and new propositions called for, charters or no charters, and if a satisfactory proposition could not be obtained the city should take the bull by the horns and build the works themselves. He didn't like the way the city council had acted anyway as a council in regard to this matter, and he wasn't in love with the treatment of the question by members of the council outside the council.

Number five, and the last of the list, but not an unimportant witness by any means, is an Irish laborer, and we will put his remarks in his own way of expressing them: "Well, sor, I had a great dispute on that same thing only the other night, and faith if I hadn't kept me temper I'd have bin worse nor angry wid the man who was bolstherin' up phat Capt. Powers beyant calls the tin-shate service. I haven't got a vote, because me rale estate is only worth four hundred dollars instead of five but there's more like me, and all I want is the scheme that'll help the new town. Sure I'm told the Capilano men will spend \$100,000 on labor alone in the town and that's more nor \$30-a head for every man, woman and child in the city. The other crowd'll not spend the third of it hereabouts. Besides all that sir, I don't like companies or contractors that ask a half a million of dollars for a job they offer to do afterwards for half price. A laboring man don't like that kind, and its many a one I met. Either they want a big grab or they don't know their business, and there's more than me thinks that about thim waterworks. It don't sound rale or natural-like that the scheme of three months ago is n't the scheme of to-day, and that the work can be done now cheaper by half than then. You scholars may do thim things on paper but the ma can't do it out on the work, and I've been over min twenty years gone by. You bet your swate life.

CORRESPONDENCE.

[In the letter we published yesterday signed "C. W. W.," the last paragraph of the last sentence but one should have read "will suffice to meet the company's expenditure and ensure the city's exemption from liability under its guarantee."]

CORRESPONDENCE.

The Coquitlam Water Works Co.

To the Editor of the News-Advertiser.

DEAR SIR—As there have been some doubts expressed as to the thickness of the plate (No 12) recommended by Mr. Shussler, being strong enough for the proposed main from Coquitlam Lake, I would submit the following extracts from a letter recently received from Mr. Isaac W. Smith, Chief Engineer of the water committee, Portland Oregon, as corroborative evidence.

In referring to the thickness of the plate pipes Mr. Smith states:

"In Texas Creek pipes for instance, 17 inches in diameter, laid by Hamilton Smith for the Bloomfield mining Co. No 14 iron was used for pressure of 325 feet * * * No 12 wrought iron would be amply strong for your 16 inch pipe. This is the iron proposed for the 22 inch pipe for conducting the water from Bull Run to this City." As the doubt cast upon the strength of the plate pipe has chiefly originated or at least been greatly augmented by a gentleman who produces from his pocket a gauge measure and shows the notch which indicates the thickness of No 12 iron, and because that is not as thick as the head of a whiskey barrel, he considers that fact a powerful argument that it will not be strong enough to hold water; I would state that as regards the comparative strength of wrought and cast iron, the safe working strength of a wrought iron pipe, No. 12 thickness, is greater than the safe working strength of a cast iron pipe three-quarters of an inch thick.

Yours truly,
COQUITLAM.

Vancouver June 1st 1887.

Vancouver's Water Works.

On Saturday the ratepayers of Vancouver will vote on the Coquitlam Water by-law. The vote will be for and against the scheme. The proposal is to carry the pipes from the lake some twenty miles distant from the terminal city down the Inlet along the line of railway to Vancouver. The piping is to be of sheet steel. The possibility of accomplishing the undertaking in this manner was submitted to a San Francisco engineer who, it is said, is an authority on such matters, and that his report is a favorable one. The lightness of the iron for carrying the water such a great distance is claimed by those who believe themselves to be capable of giving a judgment, to be entirely too light and consequently subject to frequent breakages. This scheme has a good many warm supporters. It was the one accepted by the council, but whether by fair or foul means we are not informed. It is stated that the cost of the construction of the Coquitlam system will cost a large sum of money. In that company are believed to be Mr. Robert Dunsmuir, M.P.P., the Hon. John Robson, C. G. Major, the Messrs. Oppenheimer, Messrs. Corbould & McColl and other prominent citizens of Victoria, Vancouver and New Westminster. The C. P. R. Company are said to favor the Coquitlam in preference to the Capilano, and that doing so ensures the safety of the by-law passing.

On the other hand a large, and possibly a decided majority favor the Capilano system, which is to carry the water across the Inlet in 15-inch mains, cast to withstand a great pressure to the square mile. A duplicate pipe will be laid to be in readiness in the event of accident. The distance is claimed to be only some 9 miles, as against 20 in the other plan. A greater head can be secured, as well as a splendid quality of water and in great abundance. The feasibility of accomplishing the laying of pipes under the water in the Inlet has been demonstrated in the Devil's gut at Boston, where the depth is greater and the current much stronger. This company was chartered over a year ago, and ever since have been actually to work preparing their plans. They offer to supply water without any guarantee; in this respect differing very materially from their rivals of the Coquitlam scheme. The company embraces many of our most substantial business men, amongst them being Messrs. R. P. Rithet, Thos. Earle, Capt. Irving, G. A. Keefer and many others. As an evidence of the sincerity in the matter it may be stated that already the sum of \$10,000 has been paid into the Bank of British Columbia on the company's account. The greatly less rate at which the Capilano water can be supplied to the citizens—and the preparations made will secure a complete, ample service for a population of 25,000 people—will be supplied at a much less rate than can the water from the Coquitlam.

Both schemes should have equal fair play at the hands of the Council; the electors could then vote intelligently. The subject is one requiring the exercise of much judgment and prudence, all of which no doubt the electors will ere this have weighed very carefully. The best scheme is the one that should be adopted irrespective of personal or other considerations.

CORRESPONDENCE.

The Coquitlam Waterworks Co.

To the Editor of the News-Advertiser.

Sir—The fact that the Coquitlam scheme will give from 50 to 75 per cent. more water than the Capilano has not received the consideration that it deserves. The Coquitlam Co. will put in a 16-inch main, the Capilano a 12-inch.

The fact that an extraordinary danger will always threaten the 1,800 feet of submerged pipes across the narrows from an eight mile an hour tidal current in 60 to 80 feet of water has an important bearing on the subject of insurance. People will have to pay not only a higher premium against the ordinary risks from fire on account of the inferior supply of water given by the Capilano Co., but will also have to pay in addition about one per cent. against the risks from the water which will endanger the pipes. No such risk exists in the Coquitlam scheme. The pipes are in sight, so to speak, for the whole distance, and if a break does occur it can be repaired in a short time. A break in the Capilano pipes across the channel means a month, perhaps six of them, before the service can be resumed.

The fact that insurance companies might make their policies payable only so long as those lines of pipes remained intact should be considered.

The fact that if the bylaw is defeated the object of the Capilano Co.'s bluff will be gained, as they will either then try to make new terms with the city, or try to get themselves recompensed for past expenditures from rival companies and then retire from the field with their impracticable scheme, should receive some thought.

The fact that if the bylaw is defeated that instead of having water in the city—a most urgent need—within 12 months that it will be indefinitely postponed, probably to 24 months, if it is ever brought in at all by these "boss bluffers."

The fact that no examination of the bottom of the narrows has been made by the engineers of the Capilano Co.—the one vital part of that system—and that no hydraulic engineer would venture an opinion on its practicability without information of its character, disposes of the objections some citizens take to the Coquitlam scheme. They say that both systems should have been submitted to outside authorities. That would have rendered necessary a complete survey of the narrows and a record of the currents, taking up months of time. The council did not submit the question of the practicability of the Coquitlam system, that any sensible man could see was perfectly feasible, but only the questions, "are the dimensions large enough?" and "could the works be constructed for the prices mentioned?"

The fact that Mr. Schussler, an outside and disinterested authority of well known ability and experience, has answered all of these questions most emphatically in the affirmative, should carry more weight than the *ipse dixit* of Mr. H. B. Smith, who states the contrary.

The fact that the directors of the Capilano Company are chiefly merchants with goods to sell, viz.: Mr. Turner, (of Beeton, Turner & Co.), general merchants, Victoria, Mr. Foster, merchant, Ashcroft, J. Irving, Mr. Rithet, (of Welch, Rithet & Co.), general merchants, Victoria, and T. Earle, wholesale grocer, Victoria, should be sufficient to convince Vancouver business men that they will not be allowed to sell an ounce of supplies during the construction of the works. These men have all large stocks on hand and will not favor this city one iota.

The fact that the directors of the Coquitlam are not engaged in trade and do not intend to compete against the legitimate business of the city, that their head office will be located here and the supplies for carrying on the work will be purchased in Vancouver and not in Victoria, should lead the electors to vote for the Coquitlam Co.'s system on Saturday.

"SOLID FACTS."

Vancouver, June 2, 1887.

Another from Mr. Hill.

To the Editor of the News-Advertiser.

Sir,—I notice that a letter from J. F. Ward to Mr. Keefer, relative to stability of submerged mains, has been placed in circulation in the city, and is, I suppose, a fair subject for criticism.

Mr. Ward says that, "the objection (to submerged mains) as to danger of corrosion in salt water has no force," and cites the case of certain syphons which have "been exposed between high and low tide to very salt water for over twenty-five years."

I readily admit that the danger, from corrosion, to interruption of the water service of a pipe that is "exposed between high and low water" twice in twenty-four hours, and so made accessible for repairs, is not very great—but I submit that pipes so placed should not be cited as a parallel case to that of a main pipe across the narrows of Burrard Inlet; inasmuch as the latter is not going to be "exposed between high and low water" and so made accessible for repairs or replacement.

It occurs to me also that if it had been sea water to which the pipes first cited by Mr. Ward had been subjected, he would not have thought it necessary to say very salt water.

As to the fact of iron corroding and losing bulk and strength rapidly in sea

water, the experience and observation of almost every person will have given him proof that no amount of dogmatic assertion on the part of anybody can shake.

The particular destructive effects of galvanic corrosion generated by the contact with two different metals in sea water, have of course come under the notice of fewer persons. But almost any shipmaster can tell enquirers something of the results that attend the contact in sea water of the various metals in use in ship building. Different metals generate galvanic action of different intensity, but the fact is indisputable and cannot be upset by anybody's denial, that the contact of any two different metals, in sea water generates a galvanic corrosion liable to be rapidly destructive of both.

The second instance cited by Mr. Ward is that of a six inch pipe laid in the Delaware river. The Delaware river, I take it, is fresh water; and the circumstances of a pipe not corroding there proves nothing as regards a pipe in Burrard Inlet.

Besides it is not likely that the safety of a city depends on this six inch pipe.

The next instance cited is of two 8 inch pipes across Shirley Gut in Boston harbor, in very salt water. Mr. Ward abstains from mentioning whether it was sea water, or simply a little too salt to be palatable as a beverage.

The third case cited is that of a pipe at Lawrence, Mass.: "above the large dam there," and where the freshets "scoured the sand from under it for sixty feet." I conclude that this pipe was also in fresh water, as salt water is not usually found above dams, and does not come in freshets. Therefore it is difficult to judge from this of the effect on pipes of the sea water of Burrard Inlet.

In the fourth and last instance cited the pipe is also proposed to be laid in fresh water. Mr. Ward says further: "As to there being current enough in the narrows to move the pipes, my experience shows that there is not," and he proceeds to cite, as a case within his experience,—"and the only one in which he commits himself to a statement of the velocity of currents—a pipe that he is going to try and lay next autumn!"

This, however, is anticipating. The first instance he cites is that of the six inch pipe in the Delaware. It occurs to me that it is not likely that the laying of this pipe was effected during a freshet, and that before being subjected to the current of a freshet it may have been buried under sediment, or it may have been laid in a dredged trench. Mr. Ward carefully leaves us in the dark upon these points, and also as to the velocity of the current.

With respect to the current velocity in Boston harbor he is equally non-committal, and here, again, it is to be remarked that the safety of a city may not be de-

pendent on the maintenance of these eight inch pipes, and it was probably worth while at the time they were laid to make the experiment with them.

As regards the next instance cited—that of the pipes at Lawrence, Mass.—Mr. Ward is also silent as to the velocity of current. It does not require much of a current to scour away sand—two miles an hour will do it—and from the fact of the pipe being laid above a dam I infer that there is a good deal less than sixty-six feet of water, and that the *swift current* is a good deal less than eight miles an hour. In a depth of a few feet of water, and above a dam, it may be of no great consequence that a pipe should be undermined for sixty feet so that a man could walk under it, but for the anchors of a dragging ship to foul the main pipe of this city at a point so undermined and unsupported in the narrows of the Inlet, would be a matter of much greater consequence.

I have already referred to the final instance cited by Mr. Ward in support of his opinion that there is not current enough in the narrows to move the pipes.

It detracts somewhat from the force of this citation that the pipe referred to has not yet been laid. And as Mr. Ward has pointedly abstained from submitting any data by which the parallelism could be established of any of the instances which he gives, to the project of laying a lead jointed iron pipe, on hard bottom, in sea water, and maintaining it there, in a current of six or eight miles an hour; it is to be presumed that he had no data to submit upon which he could count to make good a contention that any such parallelism existed.

He must have known whether or not the pipes he refers to were laid in sea water, and the velocity of the current to which they were subjected, and he dares any definite statement upon either point.

I have before me an item taken from a local paper, which states that the steamer Evangel, when going out of the harbor had grounded in the narrows. Where the Evangel grounded other vessels may ground, and the greater the number of vessels frequenting the port the greater the number liable to ground. Mr. Ward thinks that no trouble need be feared from so light and insignificant an object as a grounding ship, but anyone who has ever seen the effect upon the plates of an iron ship of the lightest touch upon a reef, or who has observed the effect of the collision, even at very slow speed, of the iron stem of a ship upon a wharf, will hardly be satisfied even by Mr. Ward's assurance, that the effect of the collision of a ship's stem or keel with a little pipe, lying, as has been said "like a small dam" along the bottom, could fail to be attended by disastrous dislocation or collapse of the pipe.

Mr. Ward says in conclusion that he would be pleased to face the dangers of the narrows for money. He could well afford to lose some money in experimenting here with pipe laying in a six or eight mile current before trying it in a twelve mile current in South America; and whether he succeeded or failed the result would be something which his letter does not show has any counterpart in his or anybody else's experience.

Apologising for occupying so much of your valuable space,

I am, sir, yours respectfully
ARTHUR HILL.

Comparative Strengths of Metal.

Breaking strain per square inch of cast iron, 17,900 pounds; wrought iron, 44,800 to 60,000 pounds; steel, 68,100 to 154,560 pounds.

Steel is from $3\frac{1}{2}$ to 8 $\frac{1}{2}$ times as strong as cast iron, and from $1\frac{1}{2}$ to 2 $\frac{1}{2}$ times as strong as wrought iron.

No. 10 B. W. G. steel pipes would stand a working strain of at least 16,000 pounds to the square inch of section of metal, while the safe working strain upon cast iron in a water pipe would not exceed 1,800 pounds.

[The above has been handed to us with a request that it be published. We, of course, are not responsible for the figures.]

—Ed. N.-A.]

This discussion in our columns of the respective schemes of the Capilano and Coquitlam Companies has been so full and exhaustive that were the question as to the merits of the two enterprises the point to be settled by the voters at the polls on Saturday next, no one who has carefully read the arguments on both sides can claim that he is in ignorance of the points in favor of or adverse to either scheme. The fact of there being two rival companies in the field, both anxious to expend money to supply the city with water, has even in its having given us such a thorough ventilation of the subject, already shown the advantage which the city will derive from the possibility of competition.

And the real question which the voters have before them on Saturday is not their preference for either the Capilano or Coquitlam, but whether our city shall be forced to enter into an agreement with one company which involves a heavy liability, when by judicious arrangements and cautious negotiations we can undoubtedly obtain from either or both of the rival companies everything granted us in the agreement which it was proposed to make with the Coquitlam Company without any of the liability which that agreement entailed.

We may, therefore, with certainty conclude that any new arrangement made with either of these companies, or with any other which may come forward—and we think it probable a third scheme will be proposed within a short time—will be far more favorable to the city than the one which the council have asked the decision of the electors upon. And any such arrangement must include among its provisions the right of the city to acquire possession of the works upon terms clearly defined and set forth. The success of all these proposed schemes is of course based upon the growth of Vancouver. That these promoters believe in the possibility of such a growth goes without saying. The city then must have the opportunity of taking advantage of such increase by having the power to purchase the works. One of our correspondents as an argument why the city should vote for the Coquitlam Company, instanced the comparatively small city of Victoria with a revenue from water already of \$40,000 a year. His argument is stronger against accepting that scheme as the present agreement would for ever prevent the city deriving any advantage from the growing revenue, unless the city bought out the company at the high price which it would naturally ask.

SOME timid souls have whispered that if the by-law be defeated the Coquitlam Company may build their works and yet inflict upon the city heavy charges for all the water required for city purposes or fire protection. To such persons we would say there is not the least ground for anxiety on that score. The gentlemen who are the officers of that company we have found in our intercourse with them—although we have generally been unfortunate enough to be opposed to their views—to be most courteous and men whom we should consider it easy to transact business with. But all the same the organization in which they are interested is one founded not for philanthropic purposes but for the ordinary object of making money. Now it is no unfair advantage to take of this company to repeat now what it has asserted both privately and publicly that some arrangement with the city is necessary for it in order that it may successfully complete the financial arrangements requisite to provide the capital for its enterprise. The deduction from this naturally is that it will find it necessary to have some kind of a contract with the city, and with the certainty of at least one rival bidding for the same thing, there is no reason to fear that any new proposal will be less favorable to the city.

TWENTY-ONE REASONS

Why the agreement between the city and the Coquitlam Water Works Co. should be ratified by the electors on June, 4th.

1st. Because the City Council, composed of gentlemen elected to look after the city's interests, has, after the fullest discussion and investigation into the merits of two projects of water supply, deliberately adopted that one on which the mainline of pipes is exempt from the special and extraordinary risk of damage and failure to which the main pipe of the other is subject; and has had the designs and estimates of the system adopted, examined and fully confirmed and approved by an expert.

2nd. Because the Company has conducted its business in a business-like way. In the course of maturing its plans it has gone to much expense to obtain full information upon the latest improvement in works of water supply in the United States, Canada and Great Britain; and it denies the propriety of publishing the results of its investigations and expenditure for the sole benefit of rival companies and contractors.

3rd. Because the Coquitlam Co., has not since called on to submit a final proposal, attempted to obtain any modification of its terms, or to substitute any other.

4th. Because, owing to the facilities for delivery of material either by water or by rail, and the much more favorable character of the country through which their pipe track will lie, the works proposed by the Coquitlam Company can be completed in less time than those proposed by the Capilano—and at practically the same cost, as shown by the final proposals of the two companies—the rough and rocky nature of the Capilano Canyon, and the very expensive kind of special pipe required for the duplicate submerged mains across the river, counterbalancing the cost of the additional length of main required to reach Coquitlam Lake.

And also because there is no doubt or question as to the perfect practicability of the Coquitlam scheme, while the other is but a hazardous experiment of which the result can only be conjectured.

5th. Because the main pipes of the Company are to be constructed with material which is as far superior to cast iron in its adaptation to water mains as it is in rails, in bridge work, in boilers, in shipbuilding, in gun barrels, in anything and everything in fact where strength, toughness and lightness are desired and brittleness is to be avoided.

On account of the great strength and toughness of the material and its freedom from liability to fracture under a sudden jar or strain, the main pipes of the Coquitlam Company's system will be incomparably safer from accident due to water ram or falling timber than if made of cast metal.

6th. Because, as the Coquitlam charter confers no monopoly, there is nothing to prevent the city whenever its finances admit, engaging itself in water works construction if then existing works are not to be acquired upon satisfactory terms.

7th. Because the company will as a matter of course extend their distribution system as fast as the requirements of the city demand. This extension will go on indefinitely for years and nobody can possibly at present estimate the ultimate total length or cost of the pipes. It was

necessary to specify some length of pipe to be laid before the city guarantee should take effect, and for this purpose a length of three miles was named, but it is only arrant nonsense to cite this as if the laying of distribution pipes were to cease when this quantity shall have been laid.

8th. Because the water of the Coquitlam Lake to be supplied to the city is of the most perfect purity and excellence and the lake itself, owing to its mountainous surroundings, is safe for all time from the possibility of pollution.

9th. Because the city is not likely ever again to have an opportunity of becoming a party to an arrangement for water supply under which the balance of advantage is so overwhelmingly on the city's side. In return for the temporary use of the city's credit it has secured under its agreement the use in perpetuity of the company's works, affording free of charge a fire protection of which the actual commercial value will be equal at the outset to the amount at least of the city's annual guarantee, and will increase in value from year to year long after the guarantee shall have lapsed.

The rate of \$15 per annum to be allowed for the hydrants is to cover simply the interest on the cost of the hydrant with its connection and setting and includes no element whatever of compensation for the protection afforded, which is absolutely free.

10th. Because the capacity of discharge of the Company's works will be at the outset, and will be maintained, sufficient to afford a first-class fire protection to all property in the city. At thirty-five feet above tide they will maintain thirteen hose streams under sixty pounds per inch effective pressure. At one hundred feet above tide ten hose streams and at two hundred feet above tide five hose streams under the same pressure, a much more efficient service than is proposed to be supplied from any other source.

11th. Because the Company's charter requires it, under certain reasonable conditions, to lay pipes wherever consumers demand a supply, and the agreement with the city binds the company to place hydrants upon these pipes wherever required, and to maintain throughout their system a certain pressure, therefore, both the water and fire protection services of the city are fully and sufficiently provided for.

12th. Because, under the agreement with the city, the Company engages under the penalty of a heavy forfeiture to complete the construction of the works within a year. Inasmuch as commencing a piece of work does not necessarily ensure its completion, the council no doubt, acted in the interests of the city in providing for the completion of the works which implies their commencement, instead of sticking about provisions for commencement which would imply nothing.

13th. Because the liability of the city under its guarantee is limited to a possible payment of interest at 3% per annum for ten years—on the amount of the company's bonds—for the principal sum of which (\$250,000) the city is not in the remotest degree liable, and to secure its reimbursement it holds a first claim on the Company's revenues, out of which it will repay itself. Its guarantee cannot possibly cost it a dollar in cash. It is fully secured against giving the company anything except the use of its credit to the amount and for the time stated above in

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23 OF THE 150 REASONS

WHY THE

Coquitlam Water Works By-Law

SHOULD BE PASSED BY THE RATEPAYERS

1st. Because the Council having decided that the Coquitlam scheme was the more favorable one of the two for the city, in order to ascertain whether it was also favorable from an engineering standpoint, submitted it to Mr. Schussler, C.E., who approved of it.

2nd. Because the Council having rejected the unfavorable proposition of the two companies have arrived at an agreement with the Coquitlam Co. which offers superior advantages to the city.

3rd. Because it being solely the business of the company to bring the water into the city, the ratepayers cannot be called upon for a guarantee until the water supply is an accomplished fact.

4th. Because no water pipes of any other material than the one proposed will stand as great a pressure, as has been proved beyond the shadow of a doubt.

5th. Because there is nothing in the agreement to prevent the city building their own water works at any time.

6th. Because the Company's own interest will compel them to furnish distributing mains wherever necessary, in order to obtain a revenue, and the guarantee becomes void if an efficient service is not provided.

7th. Because the water is of good quality, and its purity has never been questioned except by interested parties.

8th. Because the company give the city one-eighth of their net receipts, and with the influx of population, which may reasonably be expected, will in all probability cover the guarantee.

9th. Because the Coquitlam company will charge only \$15 for each hydrant per annum, and the Capilano company ask \$25.

10th. Because the head is sufficient to ensure a thoroughly efficient fire service at the highest parts of the city.

11th. Because the Coquitlam company are bound by their agreement to provide hydrants where required by the city.

12th. Because the Coquitlam company are bound by their agreement to bring the water into the city within twelve months after the by-law has been passed.

13th. Because the city incurs no responsibility whatever until after the water has been brought in, and then only a very limited one.

14th. Because with an abundant water supply the city will offer inducements to manufacturers to establish their factories in it, instead of at a distance from the commercial centre.

15th. Because an expenditure, necessarily heavy, will (with the exception of that on imported material) be divided among our business houses, because the company do not intend to run supply stores in opposition to legitimate traders.

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exchange for which it gets the benefit of the company's works for all time. And because a certain supply of water under a certain pressure is guaranteed by the agreement to Vancouver, the main cannot and will not be tapped at Port Moody or elsewhere to interfere with the delivery of that supply.

14th. Because, the city having secured free protection for all property within the city limits, manufacturers and others will be attracted within those limits in preference to establishing themselves outside, where property, enjoying the protection of the Company's works will have to pay for it at ordinary rates.

15th. Because the company is bound to construct and maintain a thoroughly efficient system of supply for Vancouver and it cannot possibly concern the city in any way how many other places are supplied by the company or how they are supplied; now can any possible complications arise between one place supplied by the company and another place, any more than between one consumer and another consumer.

16th. Because all supplies for the construction of their works will be obtained by the Coquitlam Co. from resident merchants of Vancouver. Whereas were the Capilano scheme carried out all supplies for it would, no doubt, be obtained from Victoria, where nearly all the members of that company live and are engaged in mercantile business.

17th. Because the city's guarantee will not be given until the company's works shall have been actually constructed, and placed in operation, and found by test to be up to the standard of efficiency guaranteed.

18th. Because the city has the assurance of the most experienced engineer on this coast, who is perfectly familiar with the subject of which he treats, that the Coquitlam Company's proposed works can be constructed for a sum within the Company's estimate of \$280,000. It is besides perfectly practicable to complete them within a year and the company will give ample security that such shall be done and if as it is said, some people in Vancouver think that these works cannot be constructed in a year, an additional and very strong reason is afforded why no part of that year should be wasted in further unnecessary negotiations, or in putting to the test experimental schemes of water supply.

19th. Because the opinion of Mr. Schussler, obtained by the City Council, was a full confirmation of the design and estimate of the cost of the Coquitlam Company's proposed works.

20th. Because, if the By-law should be defeated and the Coquitlam Company forced to retire from the field the citizens will be obliged to take water and fire protection from the Capilano Co. at any terms they may see fit to impose, since if that Company is able, as they claim to be, to construct their proposed works without municipal aid, they certainly will not allow the city to dictate to them as to how they shall frame their tariff of charges.

21st. Because were the By-law to be defeated the whole subject of water supply would have to be laid over for three months (see section 142 subsection 5 of Vancouver Incorporation Act) and then taken of anew with the certainty of further and perilous delay and the uncertainty of the city obtaining as advantageous an agreement as that now before it.

- 16th. Because the Coquitlam company can push their work ahead without waiting for the turn of the tide.
- 17th. Because the scheme has been endorsed by competent engineers.
- 18th. Because if the by-law is defeated the city will be at the mercy of a Victoria company who will probably withdraw from their present statements, and exact exorbitant terms; the ratepayers know what assistance they may expect from Victoria.
- 19th. Because the city obtain first-class security for the guarantee, holding a first mortgage on the works, and a lien on the revenue.
- 20th. As, however feasible the Capilano scheme may be, there is a certain risk in crossing the harbor, insurance rates would be higher.
- 21st. Because high insurance rates would mean :
 - 1. An remunerative use of capital.
 - 2. That merchants can only carry small stocks.
 - 3. That intending residents are driven elsewhere.
 - 4. That goods in transit will not be stored here.
 - 5. That goods on consignment will not be sent here
 - 6. That the credit of our merchants and traders will be injured.
- 22nd. If the Capilano company are in earnest they had plenty of opportunities while the schemes were under discussion to make their offer; and it is only after a more favorable scheme has been adopted that they wish to kill it, after which they would be in a position to drive their own bargain with the city.
- 23rd. Because if the pipes break under the narrows, insurance policies will be cancelled which will retard the progress of our city.

COMPARATIVE STRENGTHS OF METAL.

Breaking strain per square inch of cast iron 17,900 pounds; wrought iron, 44,800 to 60,000 pounds; steel, 68,100 to 154,500 pounds.

Steels from 3 1-2 to 8 1-2 times as strong as cast iron, and from 1 1-2 to 2 1-2 times as strong as wrought iron.

No. 10 B. W. G. steel pipes would stand a working strain of at least 16,000 pounds to the square inch of section of metal, while the safe working strain upon cast iron in a water pipe would not exceed 1,800 pounds.

THE REASONS WHY

The City Council has been blamed by the Capilano Company, or those who are trying to defeat the by-law adopting the Coquitlam scheme, for not submitting both schemes. But as it was explained very fully by the members of the Council at the time they adopted the Coquitlam scheme, they did so for the following reasons:—

1st. That by adopting the Coquitlam agreement the Council have a voice in the management.

(a) By having a member of the Council one of the directors.

(b) By their auditor having access to their books and acting as a check to extravagant management, thereby making the city's $\frac{1}{2}$ of profits valuable and insuring lower water rates for consumers.

2nd. That the construction has not one element of uncertainty.

3rd. That hydrants are furnished at \$15 only, as against \$25.

4th. That the works will be completed within twelve months as against eighteen offered by the Capilano scheme.

5th. That the city will have $\frac{1}{2}$ of the profits.

We think the Council acted very wisely in their choice and that the reasons above given are ample to justify them in the decision they arrived at.

Correspondence.

SOME NUTS TO CRACK.

To the Editor of the HERALD.

DEAR SIR,—I beg to hand you the enclosed letter from R. Dunsmuir Esq., in confirmation of the impression that the Capilano Company are not sincere in their proposals in the work of water supply for the city, and it is still further confirmed by their not having put up security as was given to be understood would be done, and even if they do so at the last moment it will be apparent to everyone that they merely wish to defeat the by-law in order that they may dispose of their charter.

I am, sir,

Your obedient servant,

E. A. WILMOT.

Victoria, May 30th, 1887.

MY DEAR MR. WILMOT.

You must not be alarmed at the bluff of the "Capilano Company" about going on with work as I know better how matters stand.

I am, sir,

Yours, faithfully,

R. DUNSMUIR.

To the Editor of the HERALD.

SIR,—As it has been stated by some that the commencement of the work for the supply of Vancouver from the Coquitlam Lake will depend upon the company's obtaining a guarantee from the city of New Westminster. I am authorized by the directors of the Coquitlam Water Works Company to state that the carrying out of the above works for the supply of the City of Vancouver, is in no way dependent upon the action of the City of New Westminster.

I am, sir,

Your obedient servant,

E. A. WILMOT.

President Coquitlam Water Works Co.

WATER WORKS.

The discussion over the water works has embraced a wide range. The practical questions, such as the fitness of material, the dangers in crossing the narrows and the cost of construction, can only be fully understood and appreciated by a very limited number. In fact, one requires to have some practical knowledge about such matters before he can come to any satisfactory decision. As most of those who will vote upon the by-law will have to depend upon the judgment and experience of others, they will have to consider the source from which they draw their information.

The only independent and disinterested opinion from a practical source which has yet been submitted to the ratepayers is that of Mr. Schussler. He is in no way an interested party. He knows nothing and cares nothing about either of the companies. He looks at such matters as are submitted to him and about which his opinion is asked, from a professional standpoint. His professional reputation is of more value to him than anything else. It is his stock in trade, and there is every reason to believe that his report to the council is based on his professional knowledge. No other writer on the water works question stands in the same relation to it as Mr. Schussler. Others may have some professional knowledge of this question, but they are also interested parties and their judgment is apt to be colored by their interest. Even Mr. Ward's opinion, indefinite as it is, is not above suspicion, because he expects to benefit by the sale of his pipes and also as being a good test of the practicability of his plan for carrying water across rivers and inlets. The question of water supply to a city like Vancouver can hardly be made a matter of experiment. There is too much at stake and the danger from fire is too great, as was recently experienced, to run any risks whatever. No man, we should think, with anything at stake in the city would venture upon a doubtful experiment in the matter of a safe water supply. It is trifling with the intelligence of the ratepayers to say that there is any possibility of obtaining water works at the present time without the City's guarantee. These works are being constructed on the strength of the future growth of the city and not on its present wants so far as the number of its inhabitants is concerned. No man even dreams of providing a water supply for the present Vancouver. If capital for their construction has to be raised outside of the Province, how better can this be done than by the citizens themselves manifesting their faith in its future in guaranteeing the bonds. There is no confidence to be placed in the statement of the Capilano Company that they will undertake the work without a guarantee. A letter from Mr. Dunsmuir, which will be found elsewhere is pretty conclusive evidence to the contrary. The question then resolves itself into the merits of the two schemes for a safe and certain supply of good water. That cannot be a question of doubt, and we think that every man who considers his own interest, which is the same as the City's, will have no hesitation in voting for the by-law to-morrow.

Quiries as to The Capilano Company's Card

To the Editor of the News-Advertiser.

SIR—In the card published by the Capilano Water Works Co., the following statements are made:

"1st. That the company is prepared to supply water from Capilano Creek without any guarantee of interest on the stock or bonds."

Query. Why did they not make that proposition when they were asked to submit their final proposal?

"2nd. That they will furnish the water within one year from June 1st."

Query. Why, when they made their final proposal (and when they might have been taken at their word) was eighteen months named as the time limit?

"3rd. That they will supply the city with water for fire purposes, and place hydrants where directed along their line of pipes for a charge of \$25 to cover use of water and hydrant for fire purposes."

Query. What possible advantage would the city derive by giving the Capilano Company \$25 a year for hydrants, when according to its present agreement with the Coquitlam Company it is to pay only an annual rental of \$15, especially as the capacity of the proposed works of the latter company is much greater than that of the former."

"4th. If the by-law is defeated and the city council prefer it our company will supply the city with water, as per its proposal of March 14th. 1887, with no variation therefrom, except as to time limit, which shall mean that the works are to be completed within one year from June 1st."

Query. As the council fully considered their proposal of March 14th in all its bearings, and rejected it in favor of the proposal of the Coquitlam Company, and has spent considerable time in framing an agreement in every way satisfactory to the city, why should the council prefer now to adopt the former proposal (and thus entail a still further loss of time in arriving at an agreement), especially by doing so they would be obliged to pay a higher price and receive less water?

5th. That they are prepared to give a bond if required for the due performance of the above.

Query. Knowing that the council cannot entertain any proposal relative to water supply, or accept any bond in connection therewith, untill the present agreement submitted for ratification of the ratepayers is disposed of, does it not look very much like a blind to influence confiding voters their making such a proposal. If they had not made the offer to put up a bond which they knew the council could not possibly accept, people might have thought their offer was made in good faith, and that their flourish of trumpets in starting surveys, meant business, and that Mr. McFarland's trip east was to close the contract with Mr. John F. Ward, as well as to obtain goods for Keefer's supply store. Yours truly,

COGITATOR

CAPILANO AND COQUITLAM.

Gigantic Efforts Made by Both Parties to Capture the Strategical Positions and the People's Vote.

Advance Guards Thrown Out—Big Guns Got Into Position—Final Words Before the Battle.

Mr. Hill's Letter Criticised.

To the Editor of the News-Advertiser.

SIR,—I have hitherto endeavored to avoid all personal allusions in my letters to you, believing that the surest sign of a losing argument is to attack an opponent's individuality. In the case of Mr. Arthur Hill's letter of to-day there is no choice, without a word of apology, or the faintest hint that he was taking an excessive liberty, he plunges headlong into a long letter, endeavoring to show that the facts mentioned by Mr. John F. Ward in regard to submerged mains are mere fables unworthy of credence. I think the general public are interested enough in the question to desire to know what the professional standing of the two gentlemen Mr. Ward and Mr. Hill may be. Mr. Ward is a civil engineer of the highest repute throughout the United States and Canada. His name can be found in any standard work on hydraulics as an eminent authority on submerged mains. He has devoted a life time to hydraulic engineering, pure and simple, and has filled positions of the highest order, his last being that of chief engineer of the Jersey City waterworks. He is the inventor of Ward's patent flexible joint pipe, which is universally used for submerged mains all over the world. He is also the gentleman who has undertaken to successfully lay the Capilano Company's mains across the inlet for a certain stated sum.

If, therefore, Mr. Ward's opinions as given in his letter of February 10th and so ruthlessly criticised by Mr. Hill, are incorrect, it will be a very serious matter for him. The double submerged main across the inlet will cost in the neighborhood of \$30,000, all of which Mr. Ward will most certainly lose should he fail in successfully completing his undertaking, having contracted on the principle of "no work no pay."

Hence, as Mr. Ward believes in his opinions to the amount of \$30,000 hard cash, intelligent citizens must naturally look with suspicion on Mr. Hill's adverse criticism, which is inspired solely by the ailing condition of a rival company and given to the public at the eleventh hour and in the hour of gloom of that company.

Against Mr. Ward Mr. Arthur Hill has arrayed himself. No doubt Mr. Hill is all that can be desired as a railway engineer, though his professional record is limited to but a very few years, journalism having seen his forte previous to civil engineering. I am tolerably well acquainted with Mr. Hill's career and I have yet to hear of his having been employed on any hydraulic works or of having ever filled higher grade in the profession than that of assistant engineer. It is almost unnecessary to say that Mr. Hill's opinions on the crossing of the narrows are given without his having had the slightest experience in such works.

You cannot afford me space to go into Mr. Hill's arguments in detail. Suffice it to say that the expression "very salt water," as used by Mr. Ward is generally opposed by intelligent men to mean a water entirely undiluted with fresh water. Mr. Hill's reading ought to have informed him that hydraulic authorities state cast iron has been known to exist for 40 years in sea water without deterioration. How much longer will exist uninjured has yet to be determined. Mr. Hill can produce no authority to show that there is the slightest galvanic action between iron and lead in contact in sea water, as in the case of submerged pipes, while I beg to refer him to information on this subject to Mr. H. C. Cressler, C. E., of San Francisco, who has just completed a mile of submerged main in tidal waters for the San Diego

Water Works Co., and also to Mr. E. P. Hamilton, of this city, who saw the Shirley Gut submerged main laid by Mr. Ward 17 years ago, and which is still in excellent condition. Mr. Hill is also well aware that when Mr. Ward states that his experience shows that an 8 knot surface current will not move a main laid on the bottom of the Inlet, his experience is backed up by theory. For further information he may enquire of deep sea fishermen, who all contend that an incoming and outgoing tide do not move the water particles at the bottom at all.

Mr. Hill will be pleased to know that about six months hence the pipes will be laid in the narrows, and the utter worthlessness of his arguments fully demonstrated.

Very truly yours,
HENRY B. SMITH.

Mr. Hill's Anxiety Relieved.

To the Editor of the News-Advertiser.

DEAR SIR,—Mr. Hill does not seem to have much knowledge of the Atlantic coast as he expresses his doubts of the water in Shirley Gut being very salt. One gallon of that water will make at least one-tenth more salt than can be made of a gallon of water of Burrard Inlet. The current there is about two knots an hour less than the current of Burrard Inlet, and in a storm there is more sea in Shirley Gut than I have seen in the narrows in five years. I lived for seventeen years in sight of it, and I never heard of anything happening to the pipes since they were put down. There have been pipes across from Boston to East Boston since '49 to my knowledge and I have hooked to them several times in storms with a vessel of 900 tons and never did any damage to the pipes; I had to cut my cables to get clear of them. At one time there have been three vessels hooked to them, and it held them all without damaging the pipes. If it would not be taking too much of your valuable space I could state several cases of submerged pipes not being disturbed by ships. Hoping Mr. Hill's doubts will be set at rest regarding the saltiness of the water in Shirley Gut,

I remain, sir,
Yours respectfully,
E. P. HAMILTON.
Vancouver, June 3rd, 1887.

Mr. Dunsmuir Contradicted.

To the Editor of the News-Advertiser.

SIR,—I observe in the Herald's edition of this evening a letter to the chairman of the Coquitlam Waterworks Co. signed by R. Dunsmuir of Victoria, in which he states "You must not be alarmed at the bluff of the Capilano Company about going on with work, as I know better how matters stand."

In reference to this extraordinary and most untruthful letter of Mr. Dunsmuir, I can scarcely believe he supposed Mr. Wilmot would put it to its present use, and I beg to state in the name of my company that Mr. Dunsmuir is entirely without the shadow of a foundation for his assertion. I can only attribute his writing such a letter to the fact that he signally failed in an endeavor to influence both myself and Mr. R. P. Rithet to resign our positions as directors on the board of the Vancouver Waterworks company. Mr. Rithet and myself both informed Mr. Dunsmuir that we were quite capable of looking after our own affairs, and were thoroughly sincere in our offer to put up a security for and to carry out the construction of the Capilano waterworks.

By affording this contradiction a space in your issue of to-morrow you will much oblige

Yours very truly,
JNO. IRVING.

Vancouver, June 3rd, 1887.

A Fair Bargain.

To the Editor of News-Advertiser.

DEAR SIR,—It has been reported around the streets that should the Capilano waterworks be built that all supplies would come through my supply store. Now I have not got any supply store in B.C., and should I get the contract I will not start one, nor will I go out of Vancouver to get one dollars worth of goods, or plant, that could be purchased here; and I will pay out every dollar of wages in this city.

H. F. KEEFER.

Some Nuts to Crack.

To the Editor of the News-Advertiser.

DEAR SIR,—I beg to hand you the enclosed letter from R. Dunsmuir, Esq., in confirmation of the impression that the Capilano company are not sincere in their proposals in the work of water supply for the city, and it is still further confirmed by their not having put up security as was given to be understood would be done, and even if they do so at the last moment it will be apparent to everyone that they merely wish to defeat the by-law in order that they may dispose of their charter.

I am, Sir,
Your obedient servant,
E. A. WILMOT.
VICTORIA, May 30th, 1887.

My DEAR SIR,—You must not be alarmed at the bluff of the Capilano company about going on with work as I know better how matters stand.

I am, Sir,
Yours faithfully,
R. DUNSMUIR.

To the Editor of the News-Advertiser.

SIR,—As it has been stated by some that the commencement of the work for the supply of Vancouver from the Coquitlam lake will depend upon the company's obtaining a guarantee from the city of New Westminster. I am authorized by the directors of the Coquitlam Waterworks company to state that the carrying out of the above works for the supply of the city of Vancouver, is no way dependent upon the action of the city of New Westminster.

I am, Sir,
Your obedient servant,
E. A. WILMOT,
President of the Waterworks Company.

Mr. Blake's Anxiety to See the Other Party's Hand.

To the Editor of the News-Advertiser.

SIR,—Some of the promoters of the Capilano Company this evening informed myself and a number of other citizens that that company had deposited the sum of ten thousand dollars with three trustees to be forfeited to the city in case the Capilano Company fail to comply with the terms of a card, which appeared in the News-Advertiser of the past week, signed by the secretary of that company.

In order to ascertain whether said deposit was so made as to ensure to the benefit of the city in case of default, I asked those gentlemen and the trustees if I would be allowed to examine the trust deed to learn whether it was so drawn as to be available in case the by-law was defeated to-morrow.

Though the trustees when applied to were disposed to permit me to examine the document they were overruled, and I was informed that no one who was not a hard and fast supporter of the Capilano scheme would be allowed to see the document.

On enquiry of the civic authorities I ascertained that they were not cognisant of the agreement and in any way parties thereto, although it professes to be for their benefit. This being the case I unhesitatingly say that the deposit is another bluff on the part of the company, and as a legal document is of no force or validity. If the city is not a party to the agreement it cannot enforce it, and is merely a last effort to induce the citizens of Vancouver to defeat the by-law.

Should the by-law not be sustained the trustees can at once return the money to those from whom they received it without incurring any legal liability from the city.

If this last proposal of the Capilano company was a bona fide one why was it not made long ago when the voters would have had time to consider its legal effect and learn whether it was binding or not. Making this offer at the eleventh hour and refusing to allow it to be seen shows clearly that it is not an honest proposition but put forward to deceive.

Supposing that the by-law were defeated in what position does it place the city?

There are, it is true, two companies empowered by the legislature to supply us with water and we would be bound by the terms imposed on us and them by their respective charters. Their charters and ours became law upon the same day and the acts must be read together to ascertain their meaning.

At present the city is not in a position to procure water for itself. It must therefore, offer some inducement to either of our incorporated waterworks companies, and in return get terms from them or else rely only upon our legal rights.

In this case on examination it will be seen how favorable one scheme is and how unfavorable the other is if it gets control. By sub-section (4) of section 142 of our city charter the corporation of Vancouver can pass by-laws "for constructing waterworks." By sub-section (5) of same section it is provided that "in the case there be any water company incorporated for the city the council must, by by-law, fix a price to offer for the works or stock of the company" before it can construct independent works.

In construing these sub-sections it is necessary to ascertain whether they are not controlled by something in the charters of the respective water works companies.

In the case of the Coquitlam company there is nothing to prohibit the city from "fixing the price" to be paid, but it is far different in the case of the Capilano Company. By section 35 of that company's charter, it is enacted that, "The value of said works and property, with twenty per cent added thereto, together with an additional sum sufficient to provide for the payment of the expenses of operation and maintenance of said works, and the payment of annual dividends equal to ten per cent. per annum on the paid up stock of the company from the date of commencement of operation of said works to the date of transfer to the said corporation," shall be paid by the city.

As it is also provided that twelve months' notice shall be given by the city to the Capilano Company, this section means that the city must pay thirty per cent. profit at least before they can buy, supposing they exercise the right at the earliest possible moment, with an additional ten per cent. for every further year they delay in doing so, with the annual cost of maintenance and operation.

If the by-law be passed the Coquitlam Company will have to give us an eighth of their profits, free water for fire service, a lien on their profits, and if we, at any time, wish to buy, they must sell on our offering to them the value of their works, or we can build works of our own.

J. J. BLAKE.

The Capilano company state in their "bluff" circular that if the by-law is defeated they will offer to supply the city with water as per their proposal of the 14th March, 1887, either with or without guarantee, as the council may decide. What does this mean? That the company intends to come before the council and try to force through their agreement of the 14th of March last, and insisting on a guarantee.

This also means delay—council being debarr'd for three months from entertaining any new guarantee in connection with water supply for the city.

J. J. B.

Mr. Eckhart, Vice-President of the American Society of Engineers, Reports Most Favorably of the Capilano Scheme.

To the Editor of the News-Advertiser.

SIR,—I have received the following telegram from my agent, Mr. Munro, at Victoria:

"Report in mail extremely favorable. It concludes—I have examined into many schemes for the proposed waterworks, but none seem to combine all the advantages that the Capilano river affords."
D. R. MUNRO."

This telegram refers to a report which has been made by Mr. Eckhart, of San Francisco, upon the plans of Vancouver Waterworks Co. Mr. Eckhart is a member of the Institute of American Civil Engineers and vice-president of the American Society of Mechanical Engineers, and is undoubtedly one of the highest authorities on the continent upon such a question as the proposed works for bringing water from Capilano creek.

By the Yosemite to-morrow morning I shall receive a printed copy of the report referred to for the inspection of voters!

Yours truly,
JNO. IRVING.

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NO BLUFF

CAPILANO WATER WORKS COMPANY

TEN THOUSAND DOLLARS

IN HARD CASH has been put up in the hands of three Trustees: Messrs. T. DUNN, I. H. HAYDEN and F. C. COTTON, as security that the **CAPILANO COMPANY** will commence construction immediately, and agree to carry out the proposition with the City of Vancouver, as offered by them on March 14th, 1887, and

EITHER WITH OR WITHOUT ANY GUARANTEE

From the City, as the Council may decide.

NEWS-ADVERTISER JOB PRINT.

NEW ADVERTISEMENTS.

COQUITLAM VS. CAPILANO.

COQUITLAM

Was adopted by the Council as being the safest and without any risk. Saves the city \$10 per hydrant yearly, which means on 200 hydrants in 10 years, \$20,000, the 1/2 net profits will average the city in ten years, say \$40,000 to \$60,000.

The city guarantees, for 10 years only, and receives therefor \$80,000 for said accommodation. But the city is still further benefited, or paid, for guaranteeing the company's bonds, and will receive every 10 years perpetually not less than \$60,000, and which perhaps will increase to \$100,000, depending of course on the increase of the population.

CAPILANO

Was rejected because there is risk; the pipes laying in the narrows and the city would have to pay the Capilano \$20,000, instead of receiving \$60,000 from the Coquitlam.

The Coquitlam water supply offers superior advantage to the city.

The water is perfectly pure.
No risk of any kind in construction or its maintenance.

With Coquitlam Water Works, the citizens will be able to insure the full amount of their property at 3/4 per cent. at the most, and as there is no danger of pipes bursting insurances will never be cancelled.

CAPILANO,

With Capilano Water Works the citizens will only be able to insure about half of their property, and have to pay at least 3 per cent., and when the pipe breaks insurances are sure to be cancelled.

Coquitlam will not interfere with the shipping coming to our harbor.

Coquitlam will encourage large shipments of consigned goods to be sent to our merchants, whereby they make handsome profits without capital.

Capilano will drive consignments to other ports to the great injury of our merchants and citizens generally.

Coquitlam encourages goods in transit to be shipped and handled here.

Capilano encourages these goods to be shipped and handled in other ports.

Coquitlam means low insurance and saving of capital.

Capilano means that the credit of our merchants, traders and citizens generally will be injured.

Coquitlam means no supply stores, buy as you please.

Capilano means supply stores, buy only at "Keefer's supply store."

To-day the voters will give their decision upon the approval or defeat of the by-law guaranteeing the interest on the bonds of the Coquitlam water company. During the past few days the public interest has been increasing, and we imagine that the election to-day will be more hotly contested than even the last municipal election. But we do not consider that there can be much doubt as to the result. It would appear to be a foregone conclusion that the by-law will be defeated. And this opinion can be arrived at without it being necessary to weigh the merits of the respective schemes. The proposition to make the city liable for the interest on the bonds of the Coquitlam company was one which was unsatisfactory to a great number of the voters from the time when the matter was being debated in the council. And the manner in which that company shifted its ground, both as to the actual details of its scheme and also the amount of assistance it required from the city, confirmed the public disinclination to the liability being assumed by the city. Beginning with practically a demand for a three per cent. guarantee on a million dollars, they finally agreed to take that guarantee on a sum not much over a quarter of that sum. There were only two things which could explain such action, either sharp practice or incapacity. The promoters of that company can take either plea, one they must, but whichever it be it is sufficient to make the voters feel that they are not such a company as our rising city could afford to be connected with. And for this reason, therefore, the by-law should be defeated.

The citizens of Vancouver realise that it is of the utmost importance to them to have a good waterworks system. They realise also that the certainty of their city becoming a place of considerable population will ultimately make the system which is adopted a very profitable one even at water rates below what other neighboring cities are content to pay. The fact that two rival companies have been for months desiring to make a compact with the city for the supply of water, almost before the town had risen from its ashes, confirms them in this belief. Although, therefore, at present not desirous of burdening their city by issuing bonds to build works of its own, they yet desire in any arrangements it may make with private companies to build works, to reserve to the city the right to secure possession of the works at any time it may find it convenient or profitable to do so. The proposition of the Coquitlam company does not contemplate anything of the kind. If by the use of the city's credit they can construct the works without any outlay of their own, they do not propose to give up a good thing when they have once got it. This with many of our citizens will, therefore, be a reason for voting against the by-law.

But another reason which will cause many voters to cast their votes against the by-law to day, is the fact that another company is intending to build works, even although the city give them no guarantee upon any bonds they may issue. The Vancouver Waterworks company or the Capilano Company as it is com-

monly called is an organization comprising some of the best and wealthiest business men of the province. These men are able to build the works without any assistance from the city either in cash or credit. They do not pretend that they are doing it for any other reason but that they consider it will prove a good investment. They desired the council to have their scheme investigated by some impartial and competent engineer, and we think that the council erred in not doing so. Denied this request they have sought to put their scheme before the citizens on its merits, and the growing favor with which it is being met, shows that the public believe after all that this will be the source from which we should obtain our water supply. Without any liability by guarantee or otherwise, unless the citizens desire it, this company will furnish water to us as soon as money can construct the works. And their system can be purchased at any time by the city upon a basis clearly defined in their charter. The more prosperous is their condition the easier will be the price the city will have to pay for their works.

THE Coquitlam Co. realising that upon the respective merits of the two schemes they must be defeated, has made a most persistent attack upon the Capilano Co., claiming that they had no intention of constructing their works unless the city guaranteed their bonds. The gentlemen most largely interested in the company being in San Francisco, nothing could be done to put their intentions any clearer before the public. But as soon as they got back, they expressed their intention of putting up \$10,000 as a proof of their good faith. And our columns this morning show that they have done this. With such a certainty of a good water supply being furnished without any liability our citizens will most certainly vote down a by-law which entails a liability for a company about whose ability, even with the guarantee, to furnish water, is very doubtful.

The mass of correspondence on the waterworks question which we publish this morning calls for little comment. The reckless statements made by the Coquitlam Company as to the intentions of the Capilano Company, the objection as to the safety and durability of its pipes under the narrows, are all shown to be without foundation. Blundering Mr. Dunsmuir and Vancouver's friend, the Hon. John Robson, are both put hors de combat. Mr. Blake with lavish expenditure of space and ink lashes himself into a fury whilst trying to show that the Capilano company should have negotiated again with the city, when as the advocate of the Coquitlam company he has for weeks past on the streets shown that, unless the by-law were defeated, the council could not accept of any proposal. But we need say no more. The voters have made up their minds that the safe course is to defeat the by-law, and then, free of its present entanglement, the city can make such arrangements as may seem most desirable for its water supply.

Voters must remember that the guarantee to the Coquitlam Company means a payment by the city of \$8,400 a year.

THE WATER WORKS.

Important Meeting of Property Owners—
The Capilano Company put up
\$10,000 as a Forfeit.

An important meeting of property owners was held yesterday afternoon at Mr. Keefer's office. Although the fact of it being intended to call a meeting was only known for an hour before, yet there was a large attendance of some of the principal property owners and voters of Vancouver.

The meeting was called to order by Mr. Dunn, who stated that its object was to hear the proposition which the Capilano Company desired to place before the voters. Upon his motion Mr. G. A. Keefer was appointed chairman, and Mr. H. Bell-Irving secretary, of the meeting.

After a few remarks by the chairman, Captain Irving said he was there as the representative of the Vancouver Water Works Co. Mr. Rithet, a gentleman well known to all those present, and who was also interested in that company, was not able to come, but had written him the following letter:

VICTORIA, B. C., 2nd June, 1887.

Dear Captain Irving:

I have a telegram from Keefer to go to Vancouver by to-morrow's boat, but I regret it will not be possible for me to do so. You, I understood, had arranged to go by to-night's steamer, and I think you can do all that is necessary and I will be satisfied to abide by any arrangement you may make in reference to the Vancouver Water Co. I am quite at a loss to understand why any further assurance should be required from our company than the deposit already made of \$10,000 in the Bank of B. C., but if it is necessary to give the citizens of Vancouver any further assurance or bond I am perfectly satisfied to leave any arrangement in your hands and will be obliged if you will act for me in this connection, and do whatever you consider necessary to assure the citizens that our company mean business, whether the by-law passes or not. Anything you may do will be satisfactory to me, and I will be prepared to carry it out.

Yours, very truly,

R. P. RITHEI.

He said that he did not think he need add anything to the statement made in the card which the company had published. Whether the city entered into any arrangement with them or not the company intended to commence construction at once and go right along with it. As, however, certain parties had been going round insinuating that the statement of the company was merely "a bluff" they were prepared to put up \$10,000 in the hands of any party satisfactory to the citizens that they intended to carry out everything which was stated in the card issued by Mr. McFarland as secretary of the company.

A discussion then took place amongst those present, when all expressed their satisfaction at the straightforward manner in which the company had acted.

A resolution was then carried nominating T. Dunn, J. H. Hayden, and F. C. Cotton as trustees in whose name the \$10,000 was to be placed in order to carry out the proposition of the company.

The meeting then adjourned.

Immediately after the adjournment of the meeting Capt. Irving sent a check for \$10,000 to Mr. Keith, the manager of the Bank of B. C., to be placed to the credit of the above named gentlemen, as the following correspondence will show:

VANCOUVER, June 3, 1887.

J. Cooper Keith, Esq.,
Manager Bank of B. C.,
Vancouver.

Dear Sir,—Enclosed please find my check for ten thousand dollars (\$10,000) payable to the order of Thos. Dunn, Isaac J. Hayden and F. C. Cotton, as trustees. The arrangement is that the Vancouver Water Works Company are to give a bond in the above sum with approved sureties to the above named gentlemen as trustees, that if the Corporation of the City of Vancouver will accept within thirty days from the time they are in a position to accept the same, the proposal of the said company of the 14th March last, with the following variations, namely: That the said company shall construct and complete their works within one year from the first day of June, A. D. 1887, and shall construct and complete the same subject to unavoidable contingencies and without any guarantee from the city, and the said company shall enter into a contract with the city in accordance therewith, then the said bond to be void.

The understanding is that you are to hold the above sum of ten thousand dollars until the bond above mentioned is handed to the trustees, and you have their written acknowledgement to that effect, when the same is to be returned to me.

In case the penalty under the said bond shall at any time become due, the amount paid or recovered thereunder is to become the property of our city of Vancouver, and is to be paid over to them.

Yours truly,

(Signed) JOHN IRVING,
For Vancouver Water Works Co., Ltd.

THE BANK OF BRITISH COLUMBIA.

VANCOUVER, B. C., 3rd June, 1887.

Messrs. Thos. Dunn, Isaac J. Hayden,
F. C. Cotton, Vancouver:

Dear Sirs,—I beg to inform you that I have received from Mr. John Irving the sum of \$10,000, subject to your order as trustees, according to the letter of Mr. Irving's of this date, of which I enclose you a copy herewith.

Yours, Faithfully,

JAS. COOPER KEITH, Agent.

CAPILANO TO THE FRONT

The People are realizing the
Importance of the situation
and are voting the

(1847)

QUITMAN BY-LAW

— D O W N —

This Day will Decide the Question
whether Vancouver shall have

— F R E E — W A T E R —

OR - WHETHER - HER - CREDIT - SHALL - BE - COMPROMISED

LOOK HERE

LOOK HERE !

The Hand Bills purporting that the Capilano Co'y have placed \$10,000 in the hands of three trustees is of no use, for the following reason: It takes two to make an agreement, the \$10,000 forfeit is no agreement whatsoever with the city, therefore there is nothing to hinder the Capilano Co'y from withdrawing their "Bluff."

Synopsis of Report

ON

CAPILANO

WATER SCHEME

BY

W. R. ECKHART, C. E.

Member Institute Mechanical Engineers; Associate I. N. A.,
London; Vice-President American Society Mechanical Engineers; and Member of
American Society Civil Engineers.

San Francisco, 31st May, '87.

"I have examined into many schemes
"for proposed Water Works, both in
"California and elsewhere, but none
"seem to combine all the advantages
"that the Capilano River affords your
"city."

"W. R. ECKHART."

ELECTORS OF VANCOUVER

See Full Report, which Arrived To-day,
before you Vote.

Extract from Report

ON

CAPILANO

WATER SCHEME

BY

W. R. ECKHART, C. E.

Member Institute Mechanical Engineers; Associate I. N. A.,
London; Vice-President American Society Mechanical Engineers; and Member of
American Society Civil Engineers.

In Mr. Eckart's Report the following passage occurs: "Concerning the San Diego pipe, Mr. Schussler writes under date of April 27, 1887, as follows: 'I have laid an 8-inch Ward Joint Pipe across San Diego Bay, and it works very satisfactorily. The pipe is laid in from 6 to 7 fathoms of water, with a current running from 4 to 6 knots. The inclination of the north bank, where the pipe entered, was 1 in 8, and the rise in south bank was 1 in 5. The bottom, for 2,000 feet is hard sand and shell. The length of pipe between tide waters was 3,100 feet. It is 8 inches in the clear, inside diameter.'"

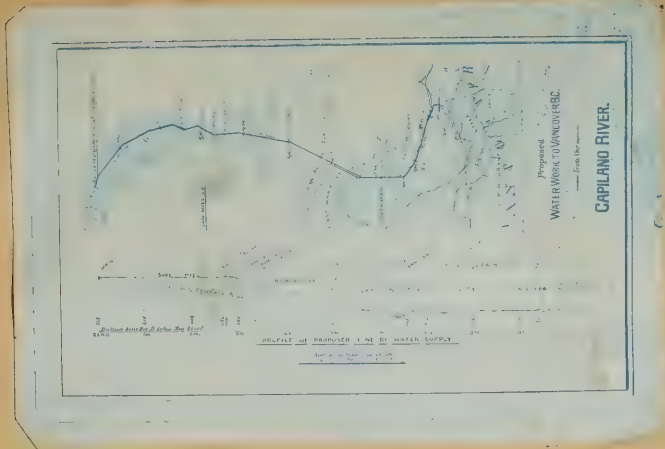
After citing several instances of the successful laying and operation of pipes submerged in salt water, Mr. Eckart says: "I consider that it is not worth while to further multiply instances of the successful operation, laying and efficiency of submerged pipe lines, as no engineer of any standing will deny their practicability, and where opposition from other sources is found, the reason for same must be attributed to other motives."

ELECTORS OF VANCOUVER

See Original Report received to-day
before casting your vote on the
Coquitlam By-Law.

(1807)

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As we predicted yesterday morning the by-law was defeated. The majority was 28 out of a total vote of 144. The number of votes polled was about what was expected. Both sides put forth their best efforts, but the election though hotly contested was conducted with the utmost good feeling. We must congratulate both parties on the way in which the discussion has been carried on from the first, without any personalities or intentional unfairness on either side.

As regards the result we need not say much. Our course has been a consistent one throughout. We have spared no effort to secure success for the policy we thought to the interests of the city and the endorsement given us by the voters yesterday is ample reward.

In this issue we print the principal portion of the report received from Mr. W. R. Eckart, of San Francisco, upon the scheme of the Vancouver Waterworks Company for bringing water to this city from Capilano river. In our issue of yesterday there appeared a short telegram which Mr. Irving had handed us, and which gave the concluding sentence of Mr. Eckart's report. To that sentence we call our readers' attention again. Want of space prevents us from giving the three sheets of formula which accompany Mr. Eckart's report. These, however, would be of no interest to the general reader, and we have no doubt the Vancouver Water Co. will be pleased to show them to any of the numerous hydraulic engineers which the water supply question has developed.

To-day the smoke of the battle has scarcely cleared away. We are not yet settled down again after the fray. We defer commenting therefore upon this report to-day, merely asking our readers to compare the clean and accurate way in which it is got up, with the hasty and incomplete memorandum upon which our council hastened to accept the Coquitlam Co.'s proposal.

We leave the document to speak for itself. Let all those who take an interest in the matter study it carefully, note how the various objections raised by confident but ignorant critics melt away like dew before the sun, and make themselves well informed not only on the scheme of pipes across the narrows, (and which is shown to be a plan neither new nor difficult), but also of the whole enterprise, including its comprehensive distributing service. Then when the time arrives to comment on the various features presented on such an undertaking, they will be able intelligently to discuss a water system which appears to us to be only rightly described by Mr. Eckart when he says referring to his examination into many schemes for waterworks, "none seems to combine all the advantages that the Capilano river affords your city."

Edmund Irvine

COQUITLAM WATER WORKS.

Vancouver Voters Reject the Bylaw by 27 Votes.

Voting on the bylaw to guarantee 3 per cent. on the Coquitlam water works scheme at Vancouver yesterday, resulted in its defeat by 27 votes. The promoters of the scheme state that they will at once proceed with the work without the guarantee and are rather pleased that the by-law was rejected, as they can now proceed without being hampered by various clauses. It is stated that the railway company favor the scheme, and will aid in forwarding its construction.

HANDSOME CONTRIBUTIONS.

Yesterday evening immediately after the polls closed, the Capilano water works Co., handed the Jubilee Celebration committee \$100 as their subscription towards Jubilee day sports. Capt. Irving also donated \$20 personally and \$50 from the Canadian Pacific Navigation Co. to the same fund. The total \$170 will make a handsome addition to the finance committee funds and the gifts are fully appreciated by the committee who only wish for more donors as generous.

NO GUARANTEE.

The By-Law Defeated by a Large Majority — The Coquitlam Scheme Rejected.

A Well Contested Fight and a Well Earned Victory — The Polling Results.

From an early hour yesterday morning the streets assumed a very lively state of bustle and excitement, and it was easy to see that some unusual event, about to take place, was the reason for the rush and commotion. Both water works companies had their forces marshalled and ready for the fray at 9 o'clock, when the polls opened, and no time was lost by them in foraging for votes. The organization of both parties was very fair, although the Coquitlam Company had evidently organized with more system than their opponents, which at the beginning of the day showed to the best advantage. The opponents to the by-law, however, soon got down to solid work and the fight commenced in earnest. About 10 o'clock it was known to the scrutineers that the majority of votes then polled were against the by-law, and by noon it was felt certain that a majority of twelve votes had been cast against it. This state of affairs called for more strenuous efforts on behalf of the friends of the Coquitlam Company, who redoubled their efforts to regain the lost ground. The opponents of the by-law, however, were fully alive to the advantage they had gained, and as nothing succeeds like success, followed it up and added to their gains. By 4 o'clock the polling was about over, and an hour of the deepest anxiety followed, but when 5 o'clock struck, and the contest was over, an expression of relief was noticeable on every face.

The following are the official returns of the voting:

	FOR.	AGAINST.
Ward 1.....	19	15
" 2.....	14	37
" 3.....	12	21
" 4.....	11	10
" 5.....	2	3
	58	86
		58

Majority against by-law.....28

Total number of votes polled, 144.

The deputy returning officer of Ward 2, in sending in his returns to the returning officer, reversed the figures, by accident, which made it appear that the by-law had been carried by a majority of 18. In consequence of this the friends of the Coquitlam Company became quite jubilant and aces that a moment before had been clouded assumed the liveliest demonstrations of joy. As the facts would have it their joy was short lived, and the error was made known and acknowledged by the returning officer as such. When the final result of the voting was known, and the defeat of the by-law acknowledged, the victorious party sent up cheer after cheer in a most hearty and demonstrative manner, which made the sweetening for many a block in the vicinity.

The day was an exciting one and the vote polled speaks well for the interest taken in the by-law and 'guarantee' by the citizens. Shortly after 6 o'clock the streets resumed their usual quiet, and it was noticeable that no drunkenness or boisterous conduct worthy of note was the result of the day's excitement.

THE CAPILANO SCHEME

Mr. Eckhart, Member of the Institute of American Civil Engineers, and Vice-President of the Society of Mechanical Engineers, Reports Favorably of the Scheme.

John Irving, Esq., Vancouver, B. C.

DEAR SIR,—I forward to you via express, all descriptive papers and tracings handed to me, relative to a proposed waterworks scheme, from the Capilano river to the city of Vancouver, and while the survey and tracings show that a great deal of time has been spent and engineering work well done in the preliminary work, I have to regret that an unexpected trip to, and protracted delay at Los Angeles, has shortened the time that I would like to have given to some of the details of the report you have requested me to make, more especially as to a proper distributive system in your city.

From your surveys, I have compiled and arranged the following data, to wit:—

It is proposed to make a storage reservoir, supplied by the Capilano river, at a distance of 9.8-10 miles (pipe course), from Carroll street.

The dam is to be 15 feet high by 175 feet long, with surface water at 430 feet and pipe entrance at 422 feet above high water mark at Burrard Inlet.

Total length of said pipe line 52,730 feet, including the flexible pipes across first narrows, which I have taken at 1,790 feet.

On account of the importance of a proper fire protection in your distributive mains within the city, I have taken the distributing head at Carroll street, equal to 246 feet above high water mark, thus leaving 176 feet fall from pipe entrance or 184 feet from water surface in reservoir, for overcoming the friction of flow in pipes.

Dividing the pipe line into two parts, the first lengths from reservoir for a distance of 14,200 feet, can be laid with 11 feet fall per mile, and with a diameter inside of smaller course equal to 16 inches, will deliver 1,609 gallons per minute, or 2,317,000 gallons per 24 hours.

The second part can be made 14 inches diameter (inside of smaller course), and with a fall per mile of 20½ feet, will deliver 2,317,000 gallons per 24 hours, with a total loss of head of 176 feet from the pipe entrance at reservoir. The quantities are for minimum service in reservoir and with an allowance for the pipes not being clean. (I have added a note to the report, of constants for calculation, using Kutler's formulae, so that comparison with other formulae or pipe service can be made if so desired.)

For crossing Burrard Inlet at the first narrows, I have retained, in my calculations, the arrangements as made by your engineer for the use of a double line of Ward's flexible jointed pipe of 12 inches internal diameter. Also in my estimate of cost of construction, I have accepted Mr. Ward's tender for constructing and laying said pipe for the sum of \$23,760. Still it is a matter for consideration whether three lines of 8-inch Ward's jointed pipe, as lately laid across the San Diego harbor, should not be adopted. The cost for crossing could then be reduced to about \$19,500, and as the reduction in diameter greatly increases their strength, each pipe becomes virtually a hollow tube, if I may so use the expression, and the cost of laying is reduced to a minimum.

In fact an instance can be cited as follows, in Massachusetts: "The supply for the public institutions on Deer Island crosses Sherley Gut, a channel 400 feet wide and 37-feet deep, by two lines of 8-inch pipe, having Ward's patent flexible ball and socket joints. The current at this point is very rapid, and instead of laying the pipes from a float stage, they were joined together on the shore and drawn across the channel by means of a windlass placed on the opposite shore." I consider that this test should be convincing to any one, of the strength and durability of the joints, but many other instances can be cited, where they have been in satisfactory operation for years.

At Toronto a pipe 36 inches diameter, 4,450 feet long, is laid on the bed of the lake.

Again, within the near future, a pipe line with the Ward joint of 16 inches diameter and in the neighborhood of 3 miles in length, will be laid in 7 fathoms of salt water.

Concerning the San Diego pipe, Mr. Schussler writes, under date of April 27th, 1887, as follows: "I have laid an

8-inch Ward joint pipe across San Diego Bay and it works very satisfactorily."

Concerning this pipe line he has kindly furnished me the following notes: The pipe is laid in from 6 to 7 fathoms of water with a current running from 4 to 6 knots. The inclination of the north bank where the pipe entered was 1 in 3, and the rise in south bank was 1 in 5. The bottom for 2,000 feet is hard sand and shell. The length of pipe between tide water was 3,100 feet. It is 8 inches in the clear inside diameter, weighed 60 pounds to the running foot as laid, and each length was 12 feet long. Each pipe was tested to 120 pounds to the square inch, and they laid, on an average, 33 lengths per day in fair weather. He estimates the cost of laying at 50 cents per running foot. The pipes were purchased direct from Mr. Ward, and although every length was tested, not a defective one was found. I consider that it is not worth while to further multiply instances of the successful operation, laying and efficiency of submerged pipe lines, as no engineer of any standing will deny their practicability, and where opposition from other sources is found, the reason for same must be attributed to other motives.

As to the main conduits. I would recommend that they be made of No. 12 iron weighing about 4.4-10 pounds to the square foot, that the sheets be rolled of suitable length and width to allow of double riveted lap joints on the longitudinal seams, and single riveting on the circular seams, and that all rivets shall be not less than 5-16th in diameter. I would further suggest that the tensile strength of the iron should not be under 50,000 pounds to the square inch, and the elastic limit of 24,000 pounds. As for spacing of the rivets, I have found it advisable, when contracting for large amounts of pipes, to proportion the pitch of rivets to the tensile strain of the iron, both before and after punching, as determined by preliminary experiments upon the iron selected. By this means the greatest percentage of strength and wear of pipe can be got from the joints made, for it must be obvious that iron having a tensile strain of 60,000 pounds to the square inch should not have the same pitch for equal strength of joint that iron of 50,000 pounds should have, besides a low grade of iron has its tensile strain greatly reduced by punching, whereas the metal remaining between the holes of a high grade of iron or steel is but little effected. I have given in note No. 2, at the end of this report a formula that I have found to work well, and I am now using the same in some large orders for pipes that I am having constructed of various diameters, from 12 inches to 60 inches. The length of pipe between each joint should be composed of two small and three large courses, or of three small and four large courses, depending upon the width of the sheets of which the pipe is to be made, and which is also governed sometimes by freight and transportation. The grain of the iron in all sheets should lie around the pipe for the greatest strength. Each joint should be made with what is known in California as the Smith and Moore joint, consisting of a short inner thimble or nipple about 6 inches long, which enters the two larger courses, and is secured by rivets to one. Over the joint is slipped a welded band of from four to five inches in width and ¼-inch in thickness. The inside diameter of the band shall be at least ⅔ of an inch larger than the outside diameter of the pipe over which it goes. The intervening space is filled with lead and calked in the usual manner. All joints should be properly calked both in the horizontal and circular seams, and where the sheets lap the edges should be thinned and chipped. A Conway calking tool will injure the pipe less and forms a better joint than the usual mode of splitting the sheets. The pipes when finished in lengths should be dipped in asphaltum and tar properly boiled until it does not become brittle when cold, or soft from the heat of the sun. All the pipes should be laid in trenches, properly dug and covered to protect the same from frost.

Self-acting air valves at high points and mud or blow-off valves at low points should be placed in the pipe where necessary along its course.

The distributing system within the city I regard as a very important consideration,

and too much care can not be bestowed upon its arrangement, for in case of fire the resources of a water department are generally taxed to their utmost, and I do not consider a static head much under 140 feet as sufficient in closely populated districts, or where valuable property is located, and it is always found that rates of insurance on property are reduced where the water supply and available head are increased.

I have based my estimate of cost upon a distributing system comprising two miles of 8 inch pipe and 6 miles of 6 inch, but as I have not been in your city since 1862, and having no grade map at my disposal, the arrangements of said pipes and hydrants to give the best service must only be considered as approximate on which to base an estimate, but I feel confident they are sufficient to cover all costs of construction.

Further, I have based my estimate for cost of material, upon the present market rates, and an assumed valuation for freight, which may be subject to correction in your case.

I have therefore tried to arrange the details of cost in such a form that you will have no difficulty in adding to or deducting from any item that you think needs correction.

ESTIMATE OF COST.

14,200 feet of sheet iron, Allen & Wood's make, of Philadelphia, weight, including laps, 281,160 lbs., costing, (price given two weeks ago), 24¢ cts. per lb.	7,731.90
8,500 lbs. of rivets for same	1,020.00
13,200 feet of 6 in. pipe, at 13 cts. per ft., lead gaskets, blocking, etc.	1,846.00
13,200 lbs. of sleeves, 6 in. at 6 cts. per lb.	792.00
Punching and rolling 14,200 ft. 6 in. pipe	1,592.00
14,200 feet, 6 in. at 25 cts. per ft. for riveting.	3,550.00
Tarring 14,200 feet 6 in. pipe	426.00
Freight on 302,860 lbs. of 6 in. pipe	4,542.00
Tearing 14,200 feet, 6 in. pipe	1,138.00
Labor on trenches and laying 14,200 feet, 6 in. pipe	4,260.00

Total.....\$26,868.80

Or \$1.89 per foot laid.

A similar estimate made for 36,830 feet of 14 inch pipe made of No. 12 iron, gives \$1.60 per ft., or a total of.....\$59,928.00

Taking Ward's estimate for the double line of 12 lb. flexible joint pipe as laid in working order, including valves as per bid.....\$23,760.00

As before stated I think that these crossings of 8 in. pipe would be preferable, and I do not think would cost more than \$19,500.

SERVICE PIPE IN THE CITY.

10,530 feet of 8 in. pipe, @ 83 cts. per ft.	\$ 8,764.80
10,530 feet, 8 in. pipe, for laying.....	2,640.00
Lead gaskets, blocking, etc., 8 cts. per ft.	844.80

Total.....\$12,249.60

31,680 feet of 6 in. pipe, @ 60 cts. per ft.	\$19,008.00
31,680 feet, 6 in. pipe, for gaskets, etc.....	1,900.80
31,680 feet, 6 in. pipe, for laying trenches, etc.....	6,396.00

Total.....\$27,244.80

The matter of freight for this 8 miles of pipe is not included in the cost, and the same will have to be added by yourself.

30 Hydrants @ \$5 each.....	\$ 150.00
Gates and special castings, 81 tons, @ \$87 per ton.....	7,023.00
Fitting, curbing and labor for same.....	3,000.00
Cost of dam 15 feet high, and say 200 ft. long, I have estimated to cost.....	7,000.00

Total, as per ab'v estimates.....\$108,927.20

Should the amount of service pipe and hydrants, as given in my estimate, not be required, you can make deductions for same as the case may require.

In conclusion I can say that from the surveys and my examination of the same, and from your statement as to elevation and quantity of water at point of supply, coupled with the fact that the total distance is under 10 miles, thereby reducing the cost of maintenance and liabilities that increase with the length of any pipe line, I can conceive of no better selection and arrangements for gravitation water works. The pressure and quantity of water seems to be unlimited, (practically speaking), and duplicate pipes, or those of a larger diameter, could be laid at any time, if an increased service should ever be required.

I have examined into many schemes for proposed water works, both in California and elsewhere, but none seem to combine all the advantages that the Capilano River affords your city.

Very respectfully,
W. R. ECKHART.

San Francisco, May 31, 1887.

11423
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MONDAY, JUNE 6, 1887.

WATER WORKS.

The by-law giving a guarantee of three per cent. by the City to the Capilano Company's bonds, we regret to say, has been defeated. The scheme, to those uninitiated in the technicalities of construction and adaptability of material for the purpose, seemed the safest and most feasible. The risk to pipes was only the common one, and there was no serious obstacle to contend against in the construction and no serious danger was to be apprehended after the work was completed. This certainly was a vantage ground for a company to occupy and it was of equal advantage to the city that the most important element which contributed to its health and safety should have nothing connected with its supply in the form of a doubt. We could understand why, as a final resort, the citizens should be willing to run great risks to secure water, but it looks like the climax of folly to deliberately prefer an unsafe to a safe means of supply. We presume that it will be admitted there is an element of danger in connection with the pipes crossing the Inlet. That danger cannot be measured. Nowhere else are the same set of surrounding conditions to be found. The strength of the current, the danger from shipping and such like are all hypothetical, and therefore any comparison between the known and the unknown is but empty talk. If, however, the vote on the by-law is to be regarded as a vote on the comparative merits of the two schemes the ratepayers of Vancouver do not view the matter in this light. Judging from the vote they prefer doubt and uncertainty to what is certain and safe. Any person can understand that pipes laid in the ground are beyond measure to be preferred to pipes laid in water, subjected to a strong current and other dangers. This is self-evident to every person of ordinary intelligence, yet, in the face of this, the other is preferred. We would prefer to think that there is some other reason for the rejection of a safe water works scheme and a good bargain, so far as the city is concerned. The vote, probably, does not mean a preference for the Capilano scheme and we are unwilling to believe that a matter of so much importance to the citizens as a safe water supply should be deliberately rejected.

If it is a better bargain that the contents are after they will not be a great while in finding out their mistake. Notwithstanding the statement of Mr. McFarlane on the authority of the company: "That this company is prepared to supply the city with water from Capilano Creek without any guarantee of interest on their stocks or bonds;" we venture to say that they will not. The company, we have very good authority for saying, are not in a position to carry out this promise. It was made for the purpose of defeating the by-law, and their next move will be to get a guarantee from the council for their bonds. They may find, however, that it is easier to propose than dispose and that a money by-law is not unfrequently easier to defeat than to carry.

We are afraid that the water supply has been postponed indefinitely and it may be some years before the city is furnished with an abundant supply of good water. We would rather that our fears in this respect were groundless and that the present gloomy outlook may soon be changed for something better.

Work Commenced.

Two parties in charge of Mr. Smith and Mr. McCammon left town this afternoon to commence the location of the Capilano pipe line to this city. This looks as if the Company meant to push ahead with their works and take the risk of all competition. In any event this city is bound to be the gainer by competition between rival companies.

THEY MEAN BUSINESS.

Preliminary Steps for the Construction of the Capilano Works to be Commenced Immediately.

Two well equipped survey parties are being organized by the Vancouver Water Works Company. These parties will be in charge of Messrs. H. B. Smith, C. E., and C. L. McCammon, C. E., who will leave to-morrow, if all arrangements are completed, for the purpose of finally locating the company's mains from the reservoir down the valley of the Capilano to the centre of the city at Carrall street. We understand that tenders for clearing and grading will be called for as soon as these gentlemen furnish the necessary information.

THE WORK COMMENCES.

Indications that the Vancouver Water Works Will Keep Their Faith.

Two complete engineering parties in charge of H. B. Smith, C. E., and C. L. McCammon, C. E., leave to-day for Capilano River to determine the final location of the pipe line for the Vancouver Water-works Co. Each party consists of ten men and are thoroughly equipped with complete outfits and every detail to do effective work. The engineers expect that within three weeks the work will be sufficiently advanced to call for tenders for clearing the right of way for the water main and for the construction of the wagon road to the head of operations. The engineers will use the preliminary survey made 12 months ago as a base of operations, and it is expected the work will be under contract within six weeks. This will be the third survey made of the Capilano Valley in the interests of this company, which ensures that the best and most suitable location will be selected. It is estimated that these two surveying parties will cost from \$80 to \$100 a day, which looks as if business was meant by the company.

(1887) 705

In Sunday's issue of the Colonist appears the following:

Voting on the bylaw to guarantee 3 per cent. on the Coquitlam waterworks scheme at Vancouver yesterday resulted in its defeat by 27 votes. The promoters of the scheme state that they will at once proceed with the work without the guarantee, and are rather pleased that the bylaw was rejected, as they can now proceed without being hampered by various clauses. It is stated that the railway company favor the scheme, and will aid in forwarding its completion.

We are sure the great majority of our readers will feel the same gratification that we experienced on reading this paragraph. That the persons who voted against the bylaw, and the gentlemen composing the Capilano Company were pleased that the bylaw was rejected, we, of course, knew. But now comes the news that the promoters of the Coquitlam Company are equally well satisfied with the result. Hearing this now we can but congratulate them on the perfect way in which they played their part, how they must have trembled lest careless voters should have considered the 23 reasons sufficient, or if they should have decided that the \$10,000 deposited was really "a bluff." Sweet indeed is now the thought of how they must have appreciated our efforts as from time to time we hammered away at their scheme, knocking off first one point and then another. Think, too, of Mr. Hill working so hard to prove that the water in Sherly Gut was very salt. And Mr. Wilmot working so hard about the rivets which Mr. Schussler had left out. As for the city fathers how they must appreciate the midnight oil which they spent trying to lick the job into shape so as to get the voters to give the guarantee which the company never wanted. Altogether it is one of the most interesting contests we ever remember, the victors and the defeated both pleased at the result.

We think, however, Mr. Dunsmuir, for he must be the person who gave the Colonist the information, as the other promoters were all in Vancouver, should have considered what might have been the result of such a statement. He now says the railway company will aid the scheme. Now to understand this as told us in the same way that the company said they wanted the guarantee, means that the railway company will not aid them. Yet if so what is his object in stating it?

THE WATER WORKS.

The Plot Continues to Thicken-- Information Refused

The tenders for supplying the city with a 16 inch rivetted mild steel main water-pipe were opened at the Council meeting last night, and were as follows: Albion Iron Works asked \$1.64½ per lineal foot for about 32,000 feet connected and leaded in the trench; air valves, \$25 each; 6-inch mud valves, \$75 each; 12-inch stop valves, \$130 each; 16-inch stop valves, \$175 each; all cast-iron fittings, \$70 per ton; delivery to commence during this year, or if delivery is deferred until May next, they will supply the main at \$1.48 per foot. E. G. Prior & Co., \$2.05 per lineal foot, delivery to commence this year, or \$1.90 to commence not later than 1st June next. Thos. W. Paterson, \$1.87 and \$1.70 as above conditions. W. Godfrey at \$2.25 and \$2.07, respectively. On motion of Coun. Coughlan, the contract was awarded to the "lowest bidder," without defining which "bid" of the lowest tenderer was accepted. The Albion Iron Works, the "lowest bidder," quoted at \$1.64½ and \$1.48 according to time of delivery, and from the manner in which their offer was accepted, they would seem to have the privilege of charging the higher figure and to begin delivery this year. However, after so much bungling in the past, it is not surprising to find a trifling mistake of this kind. This order will entail an expenditure of at least \$45,000, which does not include trenching, &c.

In examining the specifications for the new main a very serious omission has been found to exist, and no time limit is stated for the completion of the work. Surely the contractors will not have it in their power to keep the work dragging on for years. We ask, is this business? Who is responsible for this loose way of transacting the city's affairs?

The following report was presented:
 To His Worship the Mayor and Coun.

A BIG CONTRACT.

How Water-pipe is Made by the Mile.

Four Hundred Men Making Pipe at the Risdon Iron Works for the Spring Valley Water Company-- How and Where the Bay Will Be Crossed.

The Risdon Iron Works is at present engaged on its contract of bringing water from Alameda creek to San Francisco by way of San Mateo. The water will be taken from the creek above Niles in a wrought-iron pipe thirty-six inches in diameter, and led to Dumbarton point, on the Alameda side of the bay, by way of Newark and Centerville. The pipe will be laid on trestle-work over the salt marshes, and at Dumbarton point the main line is to empty into two submarine pipes sixteen inches in diameter. The distance across the bay where the pipe crosses is 6300 feet and the depth ten to fifty feet. This pipe will be laid with flexible lead joints from two barges now in process of construction for the work. On account of the strong tides and winds at the point of crossing the work of laying the submarine pipe will be very slow and difficult, and every precaution must be taken to keep the barges in proper position.

The submarine pipe will reach the west shore of the bay above Ravenswood, and from this point the three-foot main will be run to San Mateo, where it joins the main from Crystal Springs to this city.

Four hundred men are engaged in the manufacture and over 500 are employed digging the ditches and laying the pipe, all of which is included in the contract taken by the Risdon Iron Works. About 5000 tons of iron will be used in the manufacture of the pipe.

Unless the work is interrupted by unusual rains, the entire line between Niles and San Francisco will be in operation by next June.

The scene is a very active one at the Risdon Works, and in the shops where the work is being done the noise is deafening to one not brought up near a boiler works. The pipe is made almost wholly by machinery. It is made of sheets of iron riveted together. The sheets come of a regular size. They are first put into the punching machine, which punches ten rivet holes at a single operation. The edges are beveled with emery wheels and the plates are then passed through rollers which curl them into the shape of the pipe. The riveting is done by hydraulic machines, which work quietly but rapidly. Each sheet makes a single section of the pipe, and eight of these sections are riveted together to form a length. Each riveting machine adds one section to the pipe, so that the length of eight sections must pass through the eight machines. When the riveters are finished, the pipe lengths are raised to an upper floor and the calkers go carefully over all the seams to see that everything is water-tight. Thence they slide down an inclined plane to the tar-kettle into which they are dipped. When lifted from the tarry bath, drained and dried, they are considered ready for shipment. These lengths of pipe, each about twenty-four feet long, are turned out at the rate of thirty-five a day.

The barge from which the submarine pipe will be laid is ready for work. Besides the derrick for lifting purposes there are two inclined tracks down which the pipes will slide. The submarine pipes are solid wrought-iron tubes, the only peculiar feature being the manner of connecting them. They are joined by ball-and-socket joints, which fit very loosely. Melted lead is then poured in, and makes a perfectly tight but movable joint, which makes it possible to join the pipe in the barge and then sink it joint by joint.

PERSONALS.

The Rev. Dr. Beers and family are still

*San Francisco Daily Register
 11th Dec 1887*

❧ VANCOUVER WATER WORKS. ❧

TENDER FOR WORK.

_____, the undersigned, do hereby agree to furnish all the necessary plant, labor and material, for the due performance and proper fulfillment of the Contract for the Chopping, Clearing, Close Cutting and Grubbing, as may be directed, on the line of the Vancouver Water Works, in full accordance with the Specification and to the Satisfaction of the Engineer in charge, or person whom he may appoint, on or before the Fifteenth day of September, 1887, and at the following prices:

Chopping and Clearing, per acre,	-	-	-	-	\$	_____
Close Cutting,	"	-	-	-	\$	_____
Grubbing,	"	-	-	-	\$	_____

Name of Contractor _____

Address, _____

Date,

The speech of Mayor Oppenheimer at the first meeting of the new Council is worthy of careful consideration, not only by those to whom it was specially addressed, but by the citizens generally. Taken in conjunction with the reports of the various Committees of the Council and the financial statement for the past year, we have a record of progress for the last twelve months and a suggestion of possibilities, not to say probabilities for the near future, which are almost startling when we consider that the city is not yet two years old. Numerous as are the matters which Mayor Oppenheimer touches, and full of details as are some of his references to particular subjects, the address is probably quite as valuable not only for these, but for the suggestions which a perusal of it are likely to bring from some of its readers.

One of the principal events in the material progress of Vancouver during the current year will be the completion of the works which are to give its inhabitants an ample and pure supply of water at all seasons, and entirely revolutionise the present means which we have for extinguishing fires. The exciting weeks of last April and May will not soon be forgotten and the discussion which took place during the time that the "Capilanoes" and the "Coquitlams" waged fierce war upon one another, has made everyone thoroughly conversant with the details of the scheme for bringing water from the Capilano River on the north side of the Inlet, which the citizens finally decided was the most feasible scheme. The company who had the charter immediately commenced the construction of the works, and it is expected that the pipe across the Narrows will be laid before the end of this month. The company has stated that they expect to be able to deliver water in the city during the month of June. For domestic purposes this period of the year is before the wells begin to fail to any great extent, and although the people will be longing for the pure water brought down from the melting snows upon the mountain sides, yet no great scarcity or trouble about our water supply need be anticipated if the company are able to complete their works within the time mentioned. But, as the Mayor says, the question of a supply of water for fire protection is even more urgent than the requirements for domestic purposes. Under these circumstances, he suggests to the Council that it will be almost advisable to purchase another fire engine unless the company are in a position to supply water before the dry weather sets in. As will be remembered, although the winter and early spring months of last year were unusually wet, yet but a few weeks had elapsed after the cessation of the rainfall before everything was as dry as tinder, and it was only in May that the people were badly scared by the risk of a possible conflagration.

After the completion of the works and as soon as the hydrants are in place, the need of a second engine will cease. The expenditure on it would therefore be of little value to the city, whilst the incidental expenses connected with maintaining two engines ready for use would be considerable even for a comparatively short period, and these expenses would be utterly lost to the city. Would it not, therefore, be in the city's interests and of advantage to all parties if by the payment of a moderate bonus to the Company, they could be induced to expedite the works so that by the end of April or the middle of May they would be able to supply water throughout the city? We do not know what their present arrangements are, or at what date they expect the mains to arrive here. It is possible that under no circumstances could they complete the works at such an early date as we have named. But it is a matter suggested to us by a perusal of the pertinent remarks of the Mayor on the subject, and it appears to us that it is worth the consideration of the Council.

NOTICE TO CONTRACTORS

VANCOUVER WATER WORKS.

TENDERS FOR DAM.

SEALED TENDERS for the construction of a Dam and Weir on the Capilano River for the Vancouver Water Works Company will be received by the undersigned up to noon on Friday, the 20th day of January, 1888.

Plans and specification can be seen, and forms of tender obtained, on application at the office of the company, Vancouver, on and after the 27th day of December, 1887.

No tender will be received except on one of the printed forms, with the schedule of quantities correctly priced and moneyed out, nor unless accompanied with a certified bank cheque payable to the undersigned, as secretary of the company, for an amount equal to five per cent. of the total amount of tender. Each tender to be marked "Tender for Dam," and addressed to the undersigned.

The lowest or any tender not necessarily accepted.

It is recommended that each person bidding shall visit the site personally, or by competent agent, ascertain the character of the river as to floods, low water, etc., and obtain all the information necessary to enable him to make an intelligent proposal.

Bidders will state whether these recommendations have been complied with.

All available information will be given on application at the office of the company, Vancouver. Signed, J. W. McFARLAND,

Secretary,
Vancouver Water Works Co'y.
Vancouver, B. C. Dec. 23rd, 1887. 12-24

CITY COUNCIL.

Conclusion of Mayor Oppenheimer's Address.

FIRE, WATER AND LIGHT.

The duties of this Committee are also very important. The proper protection of life and property from the ravages of fire, is something without which no city can prosper. During the past great strides in the right direction were made, but as we have long since passed, according to population and wealth, beyond the mere status of a village, we must increase and keep increasing our means of combatting the devouring element. In this connection, I think it would not be out of place to give utterance to my warm appreciation of the voluntary services of our gallant fire brigade, who, from purely public spirited motives, have organized and drilled to such a degree of perfection as to be the first brigade in point of efficiency in the Province, and it is greatly through their energy, promptitude, and skill, that we have sustained such little loss from fire since the department was organized. Considering our population, and the inflammable nature of many of our buildings, I trust in the future as in the past, every encouragement will be given to our brigade by this Board and the Council at large.

The question of a complete outfit in every branch connected with our Fire Department should at all times receive attention. Water is of course indispensable, and this board should at once inquire into the possibility of getting a full supply at all times for fire purposes. As you are aware, our present supply of water for fire is supplied by tanks capable of holding 42,000 gallons of water each, and these tanks are so distributed that they can be made available at any fire which takes place within the present populated parts of the city. But as the populated area increases provision must be made for a further supply. The waters of Burrard Inlet and False Creek can also be made available, and approaches to these waters suitable for the fire engine at any stage of the tide, should be at once built, at such points as will be selected as the most convenient.

But, gentlemen, no matter how numerous are our tanks or salt water approaches, no matter how powerful our fire engine or how able and devoted our fire brigade, in a great conflagration, or in case of two or more fires at the same time, a serious calamity will again befall us if we do not increase our means of combatting it, and steps should be taken in the rainy season to place us in a position of security from any disaster in the coming dry season. The most efficacious means to furnish this security would be by a system of water works having mains laid along our principal populated districts with hydrants at proper places and with a pressure sufficient to reach and protect any building which may be erected at any place in our city. There is now, a company at work bringing such a system of water works to the city, but it is,

Capt. John Irving, of the C.P.N. Co., has been elected president of the Vancouver Water Works Company, (Capilano).

as you know, a private enterprise, and beyond our control. This Board should at once ascertain from the company referred to when they will be able to furnish us with a good water supply, and the terms upon which we can receive it. If we are not assured that the mains with hydrants will be in position by the first of June next, I strongly recommend that another fire engine be at once procured. The expense of such a purchase will be comparatively small, and will be amply repaid by the feeling of security it will engender and by the reduction in the rates of insurance which at present are very high.

A thorough system of fire alarm is also needed. Enquiries were ordered by the late Board into the comparative advantages of the different systems in use in other places, and I hope the present Board will hasten to provide us with an independent system based upon the result of these enquiries.

The question of a water supply for family and public use should engage the early attention of this board. The health of our citizens should be its first consideration, and nothing will contribute more to preserve it, and to add to the comforts of people generally, than good water. As the central portion of the city becomes more thickly populated, the wells from which the water used for domestic purposes is obtained will become tainted, and the danger of its engendering disease will be very great. It has been found by experience to be the best policy to have the water supply of a city for all purposes under the control of the corporation. The main object of a company supplying a city with water is to make money. The council of a city can have no such object. Its only desire would be to furnish water to the citizens at such rates as would pay working expenses and provide for the interest and sinking fund necessary to complete the work. The citizens could at the polls annually decide whether they are satisfied with the working of their water supply.

From these and other considerations, I would suggest to this Board to ascertain upon what terms the city can buy the charters of the two companies having the right to supply us with water, and if a satisfactory arrangement cannot be come to, then I suggest that we take steps to get an independent system with its source of supply at Seymour Creek, and to apply to the Legislature at its next session for the necessary powers to do so.

The lighting of our streets is also under the control of this Board. The present plan of lighting the city is not at all satisfactory. In the business parts of the city we have an electric light at each street corner, but general dissatisfaction prevails at the illumination afforded. This Board should at once enquire into the causes of the failure of the electric lights, and either have the candle power of the lights increased or else substitute gas for them.

BOARD OF HEALTH.

to locate power can.

From J.W. McFarland, secretary of the Water Works asking permission to have a tracing of the sewerage plan made. The request was granted.

From Philip Fewster, Winnipeg, in reference to the erection of a flour mill

Vancouver Water Works.

Yesterday W.A. Larwell who has been overseeing the work on Mr. T. Stephenson's contract of clearing the way for the laying of the Vancouver Water Works, returned to town in company with a number of his men. He says they have cleared a path 33 feet wide from the shore of the narrows to the path of the dam, a distance of six miles which leads through a section of country unsurpassed for the excellence of its timber—fir, hemlock cedar and spruce growing to an enormous size. Starting from the cleared at the West end of the town the course leads through mud pool at the head of Coal Harbor

275 feet broad and five feet deep at low water. It then runs almost due north across the Government reserve to a point near the Indian graveyard on the South bank of the narrows which are 1237 feet broad and 70 feet deep at low tide. From the north bank of the strait it follows the flats of the Capilano for a distance of 2½ miles where it strikes the side hills which it skirts for 1½ miles when it strikes the Big Cañon one of the many natural wonders of British Columbia. Here the river bounded by steep and rocky banks 50 feet high, rushes through a ravine from 10 ft. to 15 feet wide overhung with rich and varied foliage. Following this gulch for full 250 feet the line leads to a lofty ridge of rock through which a tunnel 295 feet long 6 ft high and 4 ft broad will be constructed. Beyond the rock the main passes over some miles of flat meadow land till it reaches the dam site which is 417½ feet above low water mark. This dam is to be 372 feet long including embankments 15 feet high and 53 feet broad at the bottom. The river at the dam is 100 feet wide at low water, with a surface velocity of 4½ feet per second. The area of the water way is 155½ square ft and the low water discharge is 444,000,000 gals. per day.

A number of prominent contractors have carefully inspected the whole course preparatory to tendering for the work of constructing the dam, digging the drain and laying the pipes, the plans and specifications of which are to be seen at the office of Mr Keefer, to whom we are indebted for much of our information concerning this matter. A tramway or carriage road will be constructed the entire length of the course on which to transport the pipes, all of which now lie on the C. P. R. wharf. The pipes which are to be used in crossing the narrows are connected after the fashion of a ball-and-socket joint which admits of the adjacent sections, forming an angle of 12 degrees. A model of these pipes was kindly shown us by Mr. Fred. Little, of the "Club." When completed the main, 16 inches in diameter, will lead from the tank to Granville street by way of Georgie street. From here a 12 inch main leading down Granville and along Hastings street, as far as Westminster avenue, will be laid down. Branching off to all parts of the inhabited town will be eight miles of distribution pipes, 8 in., 6 in., 4 in. and 2 in. in diameter, according to the locality. Hydrants, which shall throw a jet of 2,000 gallons per minute to a height of 108 feet from the ground level of the C. P. R. Hotel, will be placed along the distributing pipes at every street crossing. Thus it can be seen that there is not a part within the town limits where these hydrants may not throw a jet 100 feet high. The quality of the water is excellent, and is highly adapted for all domestic and laundry purposes. With such a complete and copious water system the citizens of Vancouver will shortly have nothing to fear from drouth, and may rest at ease with regard to fire.

According to surveys made by Mr. H. B. Smith, engineer in charge of the Capilano Water Works system, the following shows the height above high water of different points in the city:—C.P.R. Hotel, 108 feet; Blocks 8, 22, 9, 23, 10, 24, on the Brighthouse estate near the two big trees, average height, 175 feet; southern boundary of the city (across False Creek) average, 200 feet; promontory at the entrance to the Narrows, 216 feet. The highest point on the narrow neck of land between Coal Harbor and English Bay is 15 feet above high water mark.

The Water Works.

Yesterday morning a telegram was received from Mr. J. W. McFarland, Secretary of the Vancouver Water Works Company, who is at present in Victoria, stating that the directors of the Company had at their meeting yesterday morning awarded the contract for the construction of the dam on Capilano river to Messrs. Keefer and McGillivray. The firm which consists of H. F. Keefer and D. McGillivray, the well-known contractors, immediately on being notified that the contract had been awarded to them, with characteristic energy took the necessary steps to commence operations at once, and to-day men will be on the ground and construction commence. They expect to complete the work in about a month.

At a meeting of the directors of the Vancouver Waterworks Company held at Victoria yesterday morning, the contract for the construction of the dam on Capilano river, was awarded to Messrs. H. F. Keefer and D. McGillivray, the well-known contractors, who have decided to begin operations at once. The work is expected to take a month to complete.

The NEWS-ADVERTISER has great pleasure in announcing that Mr. C. L. McCammon, C.E., etc., etc., has been appointed superintendent of construction of the Capilano dam. This is a splendid appointment, for what Mac doesn't know about damming isn't worth knowing.

The Fire, Water and Light Committee of the Council had a meeting with the officers of the Vancouver Water Works Company yesterday in reference to the supply of water for city purposes.

(1888)

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❖ VANCOUVER ❖ WATER ❖ WORKS. ❖

TENDER

FOR THE CONSTRUCTION OF A DAM AND WEIR ON THE CAPILANO RIVER.

The undersigned, do hereby offer to perform all the work and furnish the materials for the above work in accordance with the plan and the specification for the prices set opposite each item in the following Schedule of approximate quantities.

SCHEDULE.

Description of Work.	Quantities.		Rate.	Amount.
Squared Timber, 12x12	L.	Ft.	800	
do 12x8	do	20		
do 9x8	do	60		
do 4x4	do	100		
Round Timber, 15in. diam	do	10,000		
do 12 do	do	12,000		
do 9 do	do	3,500		
Flatted Timber, 8 in. thick.....	do	610		
Plank	Ft.	B. M.	50,000	
Wrought Iron Bolts, Nails, Spikes.	Lbs.	20,000		
Cast Iron Washers.....	do	300		
Earth Excavation.....	C.	yds.	600	
Excavation in foundations of Dam } and abutments..... }	do	1,200		
Embankment.....	do	800		
Stone and brush filling in front of } Weir..... }	do	200		
Earth packing around pipes, etc....	do	50		
Hand laid rock on face of Em- } bankments, 9 in. thick..... }	do	90		
Stone Filling in Cribs.....	do	1,800		
Concrete.....	do	50		
Puddle.....	do	30		
Timber Gates.....	No.	3		
Vertical Screws to same.....	do	2		
Trap Doors to Well.....	do	2		
Wire Screens, 3 ft. 3 in. x 3 ft. 3 in.	do	2		
Cast Iron Grating.....	do	1		
Windlasses and Chains.....	do	2		
Shed, 12x13	do	1		
Total.....				\$

Signature of Contractor.....

Address

NEW WATER SUPPLY.

The Spring Valley's New Pipe Line.

AN ENGINEERING TRIUMPH.

A Submarine Line 14,000 Feet Long From Alameda Creek to San Mateo.

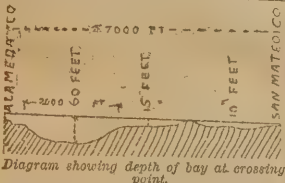
The laying of the Spring Valley Water Company's new pipe line across the bay has been completed. There yet remains about fifteen miles of piping to be laid in Alameda county. The laying of twenty-seven miles of pipe is an undertaking of no mean proportions, but the successful laying of nearly 14,000 feet of submarine pipe is a triumph of engineering skill of which San Francisco is deservedly proud. This task, which required the most skillful work, was performed in a surprisingly short space of time and in a manner which calls for the highest praise.

The pipe line, which conducts the new source of water supply to this city, connects the aqueduct, at a point about one and three-quarter miles above Vallejo's mill, on the Alameda creek, with the 44-inch Crystal Springs pipe at or near the point where the same enters the county road, about one and three-quarter miles northerly from San Mateo. Its manner of distribution is as follows: Starting from the stone aqueduct on Alameda creek, it generally follows the line of the old Vallejo's mill dike; passing Vallejo's mill, it crosses the Alameda creek on a bridge, thence going in a southeasterly direction along the public road through the towns

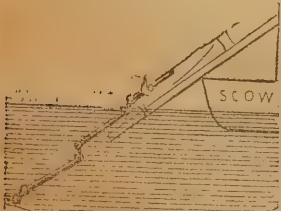
again, leaving a navigable passage about 2000 feet wide. From this point to the western shore the bed is from fifteen to ten feet below the water, except in one place, where it appears above water at low tide.

For laying the pipe a scow was used, on which was fitted a sort of derrick, so arranged as to admit of the laying of both lines at once. The pipes were fitted with what is known as a ball-and-socket joint, which allowed them a motion of twenty-one degrees. Starting to lay from one side one pipe would be fixed, then into the socket end of the one in position the ball end of another would be placed. The intervening space was filled with molten lead, which formed an effective and water-tight joint. As each pipe was fixed the line was played out, in about the same manner as if it were a chain.

The men engaged in this work lived upon the scow, which, besides being fitted up with the necessary appliances, was also fitted up for the accommodation of the workmen. The scow was also furnished with electric light apparatus, which allowed the work to be carried on by night as well as by day. The night work was, however, discontinued when it was found that the piping was being laid faster than it arrived from the East. The whole work of conducting the line across the bay was accomplished in forty days. Seamless



tubes, such as were used for this purpose, are not manufactured on this coast, all that are used here coming from the East. For the supply of water which will be conducted through this pipe line it will be necessary to erect new pumping works, as the water has not sufficient pressure of itself to carry it as required. The works are to be placed on this side of the bay. When the work now in progress is completed there will be no need of fear, hereafter, of a water famine.

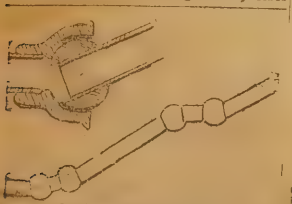


Scow used in laying pipes.

of Centerville and Newark. From thence it follows along the railroad right of way, through the salt marsh, on a pile trestle to Dunbarton point, crossing a navigable slough 300 feet wide, with submarine pipe, on the way. It then crosses San Francisco bay in a southwesterly direction—there being a double line of 6300 feet of submarine pipe—to the westerly shore of the bay. From this point it runs first along a pile trestle about 2000 feet long through the marsh, and in a southerly direction to the public road. Thence it follows the public and county roads, through Menlo Park, Redwood City, Belmont and San Mateo to the junction with the 44-inch Crystal Springs pipe.

The piping is of wrought iron, and except where it crosses the bay is thirty-six inches in diameter. That which crosses the bay is sixteen-inch tubing, five-sixteenths of an inch thick. Previous to its being laid it was galvanized inside and outside, and then dipped in a preparation of asphaltum. This piping crosses the bay in a double line, each line being fitted with a stop-valve at either end. It is the intention of the water company to have another double line of piping laid when the demand requires it. The object in placing stop-valves at either end of the lines is that in case one of the lines should receive an injury the supply of water can be shut off from it, while it will be permitted to flow through the other.

The bay where the piping crosses is about 7000 feet wide. From the Alameda shore the bed of the bay slopes to a depth of sixty feet and then gradually rises



Section of pipe and joints.

VANCOUVER'S COMMERCE.

Annual Address of the President of the Board of Trade at the General Meeting on February, 5th, 1888.

The first general statutory meeting of the Vancouver Board of Trade was held at the rooms of the Board on Monday last, the 5th inst. The Mayor, Mr. D. Oppenheimer, who is also President of the Board, was in the chair, and there was a good attendance of the members. After some routine business had been transacted, the President delivered the following address:

"GENTLEMEN: Before proceeding with the election of members of your Council for the ensuing year. I think it desirable to place before you the work which has been accomplished by the Board since its inauguration.

As you are aware, the first step to establish a Board of Trade in this city was taken at a public meeting of citizens on the 28th of September last. At that time many persons thought it premature to form a Board of Trade in a city of only 15 months growth, but I think a review of what we have accomplished, and the benefit which our labors have been to the city, will show that our organization was not too early.

Concerning the Board itself, I am pleased to be able to state that it is in a thoroughly healthy condition. The number of its members is 52, and its financial standing is sound. Though our existence has been such a short one, the work performed by the Board has been very important, embracing many matters which affected both this city and the Province very beneficially.

Before referring in detail to what has been done, I would say that the Board of Trade of Vancouver should, I think, embrace within the circle of its operations a much wider range even than the limits of this great Province. Situated as Vancouver is at the western terminus of the greatest transcontinental railway in the world, and also as the port of departure for a line of steamers to the great and populous countries on the other side of the Pacific Ocean, with the possibilities of an enormous future trade with Asia and the Australian Colonies, with unrivalled advantages as regards location for controlling the coast and interior trade of the Province, we should feel it our duty to labor earnestly so that the city may reap the advantages which she should derive from her geographical situation. The progress of Vancouver will to a great extent depend upon the exertions of her citizens, with the manner in which they make themselves thoroughly acquainted with all the resources of the Province, and with the way in which they turn these resources to account by developing them.

I will now briefly refer to the actual work done by your Council since November last, which was the time when we got settled in our present offices.

In December the presence of the Honorable John Robson, the Provincial Secretary, in this city, gave the Council an opportunity of disussing with him many matters of importance to Vancouver. Amongst them was the question of dual taxation of personal property in Vancouver. By our charter, the City Council is entitled to impose a tax on personal property. Notwithstanding this the Provincial Government has also taxed it, thus placing a double burden upon its owners. We objected to this, and Mr. Robson promised to place the matter before the Executive, and I feel satisfied that our claim for a change will be acceded to.

We also discussed with Mr. Robson the question of a mechanics' lien law. He said that, although it was not a matter for the Government to deal with, yet it would be pleased to give its support to a good measure of such a character. Since

then the Board of Trade, in conjunction with representatives of our mechanics and others, have prepared a bill on the subject that is satisfactory to the interests of all parties. We also urged upon Mr. Robson the importance of appointing a resident judge and erecting a court house in this city. Although not within the province of the Local Legislature, the honorable gentleman promised his aid in getting a judge appointed, and said that then a court house would naturally follow. We also asked that a registrar of vital statistics should be appointed here. This has since been done.

We urged the desirability of the establishment of a land registry office in Vancouver, but although Mr. Robson thought this premature, I think it is a matter of so much importance in a place like this, where real property is changing hands every day, that I would urge upon the Board to keep this subject continually before the Government. In response to further suggestions by your Council, Mr. Robson promised that a new school in the west end of the city should be built at once, and that a grant of at least 60 acres of land in the Hastings townsite should be given for a public park. He also promised that a proposal for offering a bonus for the encouragement of fruit growing would be considered by the Executive if placed before it in a practical form. His attention was also drawn to the desirability of amending the law so that a majority of ratepayers could raise a loan to effect necessary drainage improvements, such as were most necessary in the delta of the Fraser, and which would enable a large tract of land, consisting of many thousands of acres within a short distance from Vancouver, to be brought under cultivation.

Mr. Robson also promised that the Government would contribute one-half of the cost of bridging the North Arm of the Fraser River, and arrangements have since been made by this city, the C. P. Railway Company and the Municipality of Richmond, by which the road to that rich agricultural district will be constructed at once, thus placing it within easy communication of this city. Mr. Robson was also requested to urge the Provincial Government to supplement the action of your Board in impressing upon the Post office department the necessity of providing direct mail communication between Vancouver and Nanaimo, and also for extended mail communication with various places in the interior where mining industries are being commenced. Mr. Robson also offered to present the Board with a number of maps and various public documents which have since been received.

Your Council have also forwarded memorials to the proper departments at Ottawa, showing the necessity that exists for the following:—immigrant buildings and the appointment of an immigration agent here; the establishment of a marine hospital and quarantine station at this port; the necessity of granting to the city some foreshore on tidal waters, especially on False Creek; that Post Office receiving boxes should be erected in various parts of the city; that the channel of the Narrows should be buoyed and a lighthouse placed at its entrance; that permission should be granted to organize a battalion of infantry and a battery of artillery in this city; that a Government Postal Savings Bank should be established here and also a resident Post Office Inspector be appointed. Of these matters several have already been either carried out or promised, and the rest, I have reason to believe, will be favorably entertained.

(1886)

Memorial to the Government of British Columbia

OUR GOLD AND SILVER ORES.

One memorial we forwarded to the Government asked that aid should be granted to assist in building branch railways from the main line of the C. P. R. to various points in the Nicola, Okanagan, Cariboo and Kootenay districts, these being the centres of rich mineral deposits. The development of the mineral resources of British Columbia is of vital interest, not only to this city, but to the province at large. The City Council, feeling the importance of this, asked the voters to give a bonus of \$25,000 to any person who would establish smelting works of a certain capacity in Vancouver, and this proposal was agreed to unanimously by the citizens. The confidence thus shown by our own people in the mineral resources of the province has induced many outsiders to inquire into the matter; the City Council has had several proposals made to it by parties proposing to erect smelters, and I am pleased to be able to say that within a few days I expect an agreement will be concluded between the city and English capitalists for the erection of a smelter here. At present, there being no smelting works in the province, all the ore has to be shipped to Omaha and San Francisco at a cost for freight of about \$19 per ton, whilst it can be brought to Vancouver for about \$4, a difference so enormous as to require no comment. Our object in asking for aid for the branch railways referred to was to enable mining companies to get their ores to a market at a greatly reduced expense.

The records of the Gold Commissioner's office show that a large number of mineral claims have been registered during the last year. In Cariboo (which is at present 250 miles from any railway) 38 claims have been recorded; at Illecillewaet, 207 claims; at Big Bend, 26; at Kootenay, 9; at Nicola, 209; at Donald, 60. Without railway transportation, only the richest ores will at present pay to ship, as the expense of getting in supplies and shipping the ore, makes it impossible to mine the low grade ores, and without railway accommodation it is there fore impossible to develop our mineral resources. Although fifty millions of dollars have been produced from the gold of British Columbia, this has been the result of placer mining only, and, were sufficient railway facilities afforded, there is no doubt that this amount would be exceeded in very few years by the productions of our quartz mines.

Hitherto another drawback to our mining industry was the restrictions placed by our laws upon foreign mining companies. No matter what was the wealth or standing of a foreign company, by our Provincial laws the persons composing it were treated as individuals, or at the best as merely a huge partnership. This has had the effect of preventing both foreigners and companies incorporated in a sister Province of the Dominion, from investing their capital here. For years I have endeavored to bring about a change in this respect in our local laws, and I am glad to say that a bill for this purpose has been introduced in the present session of our Legislature, and there is every prospect of its being passed. By the proposed law, foreign companies will be placed upon the same footing as our local companies, and I feel satisfied this will lead to a large influx of foreign companies, and a great impetus will be given to the development of our mineral resources.

The possibilities of the mining industry are illustrated by the figures of last year's production in some of the states of the American Union. In California the production of gold and silver for that period was \$19,000,000; in Nevada, \$11,000,000; in Colorado, \$22,500,000; in Utah, \$5,750,000; in Montana, \$16,000,000; in Idaho, \$7,250,000; in Dakota, \$3,250,000; in Oregon, Washington Territory, New Mexico, Arizona and Alaska, \$9,815,000, making a

grand total of \$94,565,000. It will thus be seen that in the whole mountain range, from the south in Arizona to the Canadian border, and to the north of us again in Alaska, there has been a yield of the precious metals of nearly one hundred million dollars, during the year 1887. Is it not reasonable then to conclude that along the 700 miles of mountain range through this Province equally good results would be obtained from a thorough exploration of our minerals? I look on the establishment of smelting works in Vancouver as the initial step in the opening up of our immense natural treasure house.

IRON.

British Columbia is however, not less rich in her resources of other minerals than she is in those of the precious metals. Iron, which when found near coal, has been the foundation of some of the most prosperous countries in the world, abounds in many parts of the Province, but at present has been scarcely opened up for want of capital and the necessary works to treat it. At Texada Island, not 20 miles from our port, large quantities of magnetic iron ore are to be found. Bog ore is also found in great abundance along Puget Sound, and I have no doubt also exists in this Province. Within 40 miles of this city coal is obtained in unlimited quantities. At Sooke hematite ore of great value is found, which can be laid down in Vancouver at \$3 per ton. The direct communication between this port and China and Japan cannot fail to be of great advantage to Vancouver when smelting works are established here. For centuries these vast countries, teeming with a population of so many millions, have been closed to all the modern improvements in machinery and manufactures which exist amongst other nations. A change has, however, taken place within the last few years. Japan has already made vast strides and eagerly welcomes every new invention or idea. China also is now apparently changing the policy which has hitherto guided her rulers. Railways are being constructed, and the demand for iron resulting therefrom will certainly be very great. Into Japan alone last year the imports of iron and steel, including machinery, amounted to no less a sum than £652,667. During the past year the imports of goods into China, into the manufacturing of which iron enters largely, amounted to \$6,000,000. It is almost impossible to estimate the extent which the imports of iron and steel into these two countries will amount to within the next few years. I think that it only requires the attention of capitalists to be called to the immense deposits of coal and iron which the Province possesses, to these large future centres of consumption, and to the easy and direct means of communication which we have with them, to cause them to take steps to largely develop our minerals in the direction which I have indicated.

VANCOUVER'S IMPORTS AND EXPORTS.

In referring to the benefits that will accrue to British Columbia if it can open up a market in Japan and China for the manufactures which are beginning to spring up in our midst, permit me briefly to speak of the extraordinary progress made in Vancouver itself, the place which is most certainly destined to be the outlet and inlet for the bulk of this foreign commerce. Two years ago the townsite of Vancouver was a forest. Incorporated on April 6th 1886, it had a population of nearly 3000 when on June 13th, of that year, the whole town was destroyed by fire. Consequent upon that calamity many persons left the place where they had lost all their property by the conflagration and at the close of 1886 the population did not exceed 1500. To-day we have within the city about 6500 people.

There are 15 miles of streets with many fine business blocks of stone, brick or cement and wood, with handsome residences scattered all over the beautiful site on which the city is located. The first train from the Atlantic seaboard only arrived in Vancouver on May 23rd last, about nine months ago. On June 13th, 1887, precisely one year after the fire there steamed into our magnificent harbor the Abyssinia, the first of the Canadian Pacific line of steamships from China and Japan. Since that time at intervals of about 3 weeks, one of these steamers has arrived and sailed from our port, bringing here the silks, teas, rice and curios of the east and carrying from our shores the products of our shops and factories, to the value of many hundreds of thousands of dollars. Within a short time these sailings will be fortnightly, to be still further reduced ultimately to a weekly service. Already negotiations are on foot for another line between Vancouver and the Australian Colonies, destined to develop a large trade between these far distant parts of the British Empire.

To the east of our province for hundreds of miles there are prairies destitute of timber, but the soil of which places that country amongst the richest agricultural portions of the globe. Already on those great plains "is heard the tramp of pioneers, the vanguard of a nation soon to be," and within the next few years we may expect to see those great territories covered with flourishing farms, the abode of a happy and prosperous people. With them we should have an extensive trade. We can supply them with the products of our mines, our fisheries, our orchards and our forests, whilst in return we take their breadstuffs (which they can raise cheaper than we can) for the feeding of our people and for our shipment to our customers in China and Japan.

It is, however, necessary that we should study all these markets, make ourselves acquainted with the requirements and peculiarities of each, and in this matter the Board of Trade can be of the greatest possible advantage to our merchants and manufacturers by obtaining and disseminating amongst them the requisite knowledge.

OUR FISHERIES, FORESTS AND FRUIT.

British Columbia is known all over the world by its salmon, which, when canned, is sent to every quarter of the globe. The canneries, extensive as they are, are still capable of large increase. Another branch of this industry has, as yet, not been really commenced. I allude to the shipment of fresh fish by means of refrigerator cars all over the eastern part of the Dominion, which is destined within a few to prove a large source of traffic to the C. P. Railway. Our waters abound with many other kinds of fish, but no systematic attempt has as yet, been made to develop this branch of our fisheries. When this is done, this industry will itself support a large population, either in the actual fisheries themselves or in their kindred branches, and Vancouver from its excellent location will be the centre of this trade.

Of our forests I need say but little. Our province is famous for its timber, and the lumber manufactured from our fir, our cedar and our pine is recognized as the best that is produced on this continent. The foreign lumber trade has already assumed large proportions. In our harbor to-day are six large ocean going vessels loading for China, Japan, South America and Australia, and this business will shortly be supplemented by extensive shipments of lumber to China and Japan by our line of steamers. Our sash and door factories are also commencing to send their manufactures to foreign countries, whilst whole train loads of lumber and of manufactured woodwork are constantly being sent by the railway to the eastern provinces.

Every description of fruit raised in the temperate zone can be raised here in the greatest abundance and excellence. Although in the valley of the Fraser fruit culture has been carried on for many years with great success, the production is insignificant compared to what it will be in a few years. The market in the Northwest territories alone will tax our efforts to supply it, and it is difficult to point out a pursuit which offers better returns to the small capitalist or agriculturist than is to be found in fruit raising in British Columbia.

THE WESTMINSTER DISTRICT.

The rich section of the province known as the Westminister District, and in which Vancouver is situated, contains the largest amount of agricultural land to be found in the province. Along the Fraser River are large alluvial tracts of unsurpassed richness. It is estimated to contain 500,000 acres, and is intersected by two great commercial arteries, the C. P. Railway and the Fraser River. The average annual rainfall is from 50 to 60 inches. Some of this land is timbered, whilst other parts of it are either open country or dotted with underbrush. The soil is generally a deep black, with a clay subsoil. Enormous crops can be raised upon these lands. Although wheat has sometimes failed to ripen, very large crops can be raised. From 60 to 80 bushels to the acre is a common yield. Oats will give 75 bushels, barley 40 bushels, turnips 40 to 50 tons, potatoes 30 tons. Roots and vegetables attain an almost incredible size. Pumpkins weigh 50 to 70 lbs., squash 60 lbs., vegetable marrows 9 lbs., cabbage 25 lbs., onions 1½ lbs., turnips 16, mangolds 20 lbs. The average yield of hay is 3½ tons to the acre. Hops do well, and the strength and fertility of the delta lands within a short distance of Vancouver are almost unrivalled. Whilst, however, all these products are raised easily and find a good market, the growing demand for all descriptions of dairy produce which Vancouver offers presents extraordinary inducements to the industrious farmer. Besides this, eggs, chickens, geese and turkeys all command high prices, and at present our market is chiefly supplied with these things from the eastern provinces or by importations from the States. These things must be raised in the province. By this means thousands of dollars will be kept at home to be expended amongst our merchants and mechanics which are now sent abroad. I advise immigrants to purchase small tracts of land, say from 50 to 100 acres, cultivate them thoroughly, and the net returns will far exceed what can be realized from ten times the quantity of land in the prairie states and provinces. The people of Vancouver must see that good roads are built at once throughout these farming districts, bringing them all into easy communication with our city.

CANADIAN PACIFIC RAILWAY.

As a pioneer of this province I cannot refrain from alluding to the inestimable benefit which has resulted to British Columbia from the construction of the great transcontinental railroad of which Vancouver is the western terminus. That this young nation should undertake such an immense enterprise is a proof both of its energy and of its belief in the future of the Dominion, and it is the duty of every citizen of Canada to aid as much as possible in making the road financially a success. It has opened up to capitalists the great mineral resources on the north shore of Lake Superior and of this province, and has made accessible the millions of fertile acres in the great North West, whilst it has opened an Imperial Highway entirely under the shelter of the Union Jack from England to the great British possessions in Asia and Australia. Travelling as I have done through this province

before the railroad was built, I can fully realize the benefits we derive from it. At present only the main line is built, yet the local traffic along it pays fairly well. But when branch lines are constructed, radiating to all points within the province, not only British Columbia, but the Company itself, will derive immense benefit from the vast increase in trade which such enterprises will make possible.

STEAMSHIP SUBSIDY.

At the time British Columbia entered the Confederation, the only means of communication with the east were by the Central and Union Pacific Railways via San Francisco. The trade between this Province and the States was small, and in order to establish a fortnightly mail service the Dominion Government granted a subsidy to a line of steamers between Victoria and California. But the completion of the Northern and Canadian Pacific Railways has changed this state of things, and, by our national road, we now receive our Eastern and European mails every day with great regularity, and in a much shorter space of time than was possible before. The construction of a railway along the coast, from San Francisco to Puget Sound, also brings us our daily mail from California, instead of the fortnightly or weekly mail by these subsidized steamers. At the time that this steamship line was subsidized, it was necessary to get an American company to perform the service. The result of this is now, however, a matter of great inconvenience and loss to any other Provincial port than Victoria, as steamers under the American flag cannot call at two Canadian ports consecutively. An illustration of the injury this causes us is seen in the fruit trade of Vancouver, which is greatly injured by the delay and transshipments caused by the present arrangements. I would therefore urge upon this Board the importance of asking the Dominion Government to subsidize a British instead of an American line of steamers. There can be no doubt that at the time that this subsidy was granted it was intended as much as a subvention in the interests of trade and commerce as for a mail subsidy, and we should insist upon the subsidy being continued for this reason, even if its necessity for mail purposes is no longer as urgent as it was at the time it was originally granted.

GENERAL MATTERS.

This Board should urge upon the Dominion Government the necessity of legislation as regards a good Bankruptcy Law to enable all creditors to obtain a *pro rata* share of the effects of an insolvent debtor. The present law works unsatisfactorily in this matter and also entails much useless litigation.

An amendment in our Navigation laws is necessary to prevent American tugs from towing in Canadian waters. I would also call the attention of this Board to the discrimination made by the tug companies of Victoria in favor of vessels bound to that port. Whilst ships coming to Vancouver are often compelled to lie at anchor for several days in the Royal Roads waiting for a tug, vessels for Victoria obtain towage without delay.

Efforts should also be made to prevent foreign steamers bringing longshore men with them to unload and load their cargo here, thus preventing our own laboring population from obtaining the employment to which they are legitimately entitled.

Mr. Oppenheimer also referred to the matter of the storage of explosives in the city; to the present inconvenient arrangement of the Post Office as well as of the Custom House; to the question of obtaining a remission of the duty on the machinery of the smelter, of preparing a suitable collection of mineral specimens and gathering of information respecting mines. After stating his opinion that the time had come when the Board should appoint a permanent secretary, who should give all his time to the duties of his office, Mr. Oppenheimer briefly referred to this city's industries and commercial establishments.

“THAT A CITY of over 6000 people should spring up in less than two years, with all the substantial improvements that we see around us, is in itself surprising. Yet the trade which must inevitably centre here within the next few years warrants the prediction that in a short time San Francisco alone will excel us in population, wealth and commerce on the Pacific Coast. The trade of the whole interior will pass into the hands of our merchants, whilst this city will be the centre of the great smelting industries, of iron manufactories, and of many other industries. Through Vancouver will pass the immense trade of the Dominion with Asia and Australia. Already we have no less than seven saw-mills turning out millions of feet of lumber annually, two sash and door factories, three furniture factories, two iron works and machine shops—one of them being the largest in the province,—boiler works, three breweries, soap works, lime works, soda water works. The city is lighted by both gas and electricity, and in the course of a few months will have one of the finest systems of water works to be found on the continent. All these undertakings have been started by private enterprise. Trade and commerce is represented by numerous houses, both wholesale and retail, whose commercial ramifications extend not only over this province, but throughout the adjoining territories, whilst our produce and commission merchants handle an immense amount both of domestic and foreign produce. Three chartered banks, those of British Columbia, Montreal and British North America, and one private banking firm, Wulfssohn & Bewicke, conduct the financial business of the city. I must not omit to mention the extensive operations carried on here by the C. P. Railway Company, whose monthly pay roll is about \$25,000.”

At the conclusion of the President's address the Secretary read the financial statement and the record of the business transacted by the board since its inception. He also furnished some very interesting and valuable statistics concerning the business of Vancouver.

The President, Vice-President, and the whole of the old Council were re-elected, and after a cordial vote of thanks to the President for his able address, the meeting adjourned.

The recent rains have so swelled the Capilano river that the force of water displaced one of the piers of the dam, and part of the work will have to be taken down and rebuilt.

News Advertiser, March 22nd

Mr. J. W. McFarland, Secretary of the Vancouver Water Works, has returned from an official visit to the Capilano Dam.

Up near the Capilano dam there is a big cedar which is 54 feet in circumference. This is evidently the result of Capilano water.

Mr. J. W. McFarland has returned from a final visit of inspection to the Capilano dam. He took up with him a photographer and several views of the grand scenery of the Capilano valley have been secured.

Messrs. Brook & Co., have been taking photographic views of the Capilano Waterworks dam and vicinity for the waterworks company. These views show the very creditable work which has been done by this company, and are very interesting.

Capilano Dam.

The *Columbian* says that it is reported that the dam built by the Capilano Water Co. on the Capilano river, has been carried away by the floods and will have to be completely rebuilt.

The Capilano Dam.

A short time ago a paragraph appeared in these columns stating that floods had carried away the dam erected by the Capilano water company north of Burrard Inlet. We have a letter from Mr. H. B. Smith, the resident engineer, stating that there was no foundation for the report. The engineer says that the floods in Capilano River have demonstrated the substantial character of the work, inasmuch as it completely withstood the strain to which it was subjected. The only damage done was a slight undermining of one of the abutments, consequent upon the fact that the contractor had not time to connect it with the river bank. The whole damage, the engineer says, was repaired in a few days, and the structure will be entirely completed by the end of this week.

Capilano River Dam.

In reference to the report, first mentioned by the *Columbian*, that the dam built by the Vancouver Water Works Company, on the Capilano river, has been carried away by the floods, Mr. Henry B. Smith, the company's engineer, writes us: "No such report was current in this city. The recent floods, which were exceptionally severe, did no material damage to the structure. The east abutment, which the contractors had not had time to connect with the bank of the river was slightly undermined, but the damage was repaired in a few days, and the structure is now all but completed."

Advertiser
Mr. J. W. McFarland, the secretary of the Vancouver Water Works Company, states that the "Camona" with the pipes for the distribution service on board sailed from Liverpool on Dec. 20th and was spoken on Feb. 10th in Lat. 5 N., Long. 21 W. The "Ian Baas" with the plates for the mains sailed from London on Jan. 10th. The Company has received a telegram from Mr. John F. Ward, who has the contract to lay the pipes across the Narrows, saying that he leaves New York for Vancouver this week. There appears, therefore, no doubt, unless some accident to the above vessels should happen, that the Company will be able to supply Capilano water to this city before the end of July.

(1899)
Mr. John F. Ward, the engineer, has made an inspection of the Narrows at the point at which it is proposed to lay the pipes of the Vancouver Water Works Co., and is very well satisfied with it. He is making arrangements for the commencement of work at once, and has given several large orders to the new iron works in this city. Mr. Fred. Little has been appointed superintendent of the work of laying the pipes, and within a few months the city will have one of the best systems of water supply on the continent.

At 8:30 this morning the tug Nellie Taylor, left the Hastings Mill Wharf for the First narrows with all the lumber for the scaffolding, and for shooting out the pipes and other purposes for Mr. J. Ward's contract in connection with the Capilano waterworks. The necessary apparatus will be got ready as quickly as possible under the superintendence of Mr. F. Little.

It will not be long, probably only a few months before the city will be supplied with water from the Capilano river across the Inlet. Mr. F. Little, who has been appointed superintendent of the work of laying the flexible joint pipes from the river dam to the city, has already a number of men engaged in the preliminary part of the work. The point across the First Narrows at which the pipes will be laid is decided upon; and there appears to be no impediment to the work of laying the pipes under the water being carried out successfully. Mr. J. Ward is the contractor.

The tug Nellie Taylor yesterday towed over a quantity of scantling for use in the work of laying the pipes for the Water Works. Capt. Fred. Little is in command of the expedition.

The tide in the middle of the day is very low at present and the channel in the second Narrows is a very small one.

Advertiser
On Monday A. D. Humphreys, of the new dam for the waterworks at the Capilano river, and returned yesterday. He speaks of it as a most substantial and excellent piece of work, which is a great credit to the contractors, Messrs. Keefer & McIlwain, and especially to the company's engineer and inspector, McCammon. The dam will be completed within a very few days.

Mr. Fred. Little has commenced loading the pipes for the water works, that have been lying on the C. P. R. wharf for some time, on a scow which will be towed over to Capilano to-day, and work commenced as soon as possible.

Mr. J. W. McFarland, secretary of the Vancouver Water Works Company, arrived in the city this morning on the Louise.

Advertiser
Mr. John F. Ward, A. I. C. E., accompanied by Mrs. Ward and son, arrived in this city yesterday, and is staying at the Leland House. Mr. Ward is the inventor of the famous flexible joint water pipe which has been adopted by the Vancouver Water Works Company to bring the water across the harbor from Capilano River. In the afternoon Mr. Ward, accompanied by Mr. George Keefer, C.E., and Mr. J. W. McFarland, Secretary of the Company, went out in the steamer Nellie Taylor to the Narrows and made an inspection. Mr. Ward is perfectly satisfied with the feasibility of the scheme and the operation of laying the pipe will be commenced at once.

Advertiser
All the pipe to be laid across the Narrows for the Capilano Water Works, was loaded on a scow yesterday, and will be taken across to-day. Work will be commenced as soon as possible.

Advertiser
The tug Saturna arrived from Victoria yesterday. She has been engaged by the Water Works Company to assist in the work of laying the pipes across the Narrows.

Advertiser
The flexible-jointed piping for the waterworks was deposited yesterday at the point on the Narrows where it has been decided to make the crossing. At low tide the distance across is about 1,250 feet. Mr. J. Ward, who holds the contract for this part of the work, states that it will be necessary for them to prepare certain requisite apparatus before they can make great headway, but expects that all necessary preparations to commence the actual laying of the pipes will be ready in about a week. The flexible pipes will be jointed together with lead, and will lie at the bottom of the water in such a manner as to suffer in no way from the under currents or the ground swell which are so often disturbing elements deep under water. The surface of the ground on which the pipes will lie is not believed to be very irregular. The Waterworks Company will lay their pipes from the dam to connect with the flexible pipes at the Narrows. They will also provide all the pipes for conducting the water throughout the city. These pipes are now on their way from England.

Advertiser
Mr. J. W. McFarland, the Secretary of the Vancouver Water Works Co., who returned from Victoria yesterday, states that at a recent meeting of the Directors, the engineer of the company was instructed to prepare the necessary specifications, so that tenders can be called for at once for all the work on the Company's line north of the Inlet. This includes the tramway, the tunnel and the trench for the pipe from the dam to the shore, and the whole of this work will be completed by the time that the pipes arrive from London.

Vancouver Water Works.
Mr. J. Ward, who holds the contract for the flexible joint water pipes to be laid in connection with the waterworks, returned from his visit to the Capilano river dam, and the work of laying the pipes will at once be commenced. Mr. Ward when he went over yesterday was accompanied by Mr. George Keefer, C. E., contractor for the waterworks, and by Mr. J. W. McFarland, secretary of the company, who report everything to be in a favorable state of progress.

Capilano Water Works.

Mr. J. W. McFarland, secretary of the Capilano Water Works Co., yesterday showed a representative of THE COLONIST four photographs of the source of supply, where the dam is constructed. One picture is taken from below the dam, and shows the extent of work that has been done. The dam is 125 feet in width, at one side being a flume for lowering or raising the water at will, and for the escape of waste. At the other side the water passes into a well, and through a series of screens before it enters the 22-inch steel pipe which carries it to the canon below. Here there is a steep descent through a 16-inch pipe, which again empties into two 12-inch pipes crossing the narrows at the entrance to Burrard Inlet. A 16-inch pipe carries the water from the Inlet to Georgia street, and after this a 12-inch main runs along Georgia street and Westminster avenue, branches leading off to the various portions of the city. The other pictures are taken from above and at each side of the dam. The works are situated seven miles from the Inlet, in the midst of primeval solitude, the mountains capped with perpetual snow, rising a couple of thousand feet above in the background. The water is pure and sparkling, fresh from its sources far up the mountain sides, and when distributed over the city, Vancouver will possess a generous and never failing supply of that great desideratum of all cities—pure water.

The Saturna, Capt. Pike, which has been chartered by the Vancouver Waterworks Co., left the City wharf this morning with a good crowd of men to prepare for the work of laying the pipes across the Narrows.

Vancouver Water Works Co.

At a recent meeting of the directors of the Vancouver Water Works Co., the company's engineer received instructions to prepare the requisite specifications for the whole of the work on the North part of the Inlet which will be let by contract. The water pipes for the use of the company, and which have been ordered from a firm in London, are expected to arrive within a reasonable time. Meanwhile the whole of the work of tunneling and trenching, irrespective of Mr. H. Ward's contract will be included in the contract for which tenders will be called as soon as the specifications for the work are ready. The work of getting into position all the apparatus required for the laying of the flexible pipes across the Narrows, is being pushed, under the superintendence of Mr. Fred. Little.

In an interview with Mr. Keefer, C.E., of the Vancouver Waterworks Co., he stated that the contract for the work on the Capilano river from the Narrows to the dam would be let in a few days. As soon as the consignment of pipes arrives, which was shipped by sailing ship last January, work will be pushed and it is confidently expected that the city will be in receipt of its water supply about the 1st of September next.

The Vancouver Water Works are calling for tenders for the work of tunnelling, the excavating and refilling of the pipe trench, and the distribution of pipes along the line of the trench between the Narrows and the Capilano dam, about 6½ miles.

Advertiser May 5th

NEW ADVERTISEMENTS.

VANCOUVER WATER WORKS.

Notice to Contractors.

SEALED TENDERS will be received by the undersigned until 12 o'clock on

FRIDAY, 25th MAY, 1888.

For the work of Tunnelling, Excavation and Refilling of pipe trench and the distribution of pipes along the line of trench between the North shore of Burrard Inlet and the dam on Capilano River, some six and one-half miles.

Specifications can be seen and forms of tender, together with all necessary information, obtained on application at the office of the Company.

No tender will be received except on one of the printed forms with the schedule of quantities correctly priced and moneyed out; nor unless accompanied with a certified bank cheque equal to 5 per cent. of the amount of the tender payable to the undersigned as Secretary of the Company; Each tender to be marked "Tender for Work" and addressed to the undersigned.

J. W. McFARLAND,

Secretary
Vancouver Water Works Company.
Vancouver, B.C., May 5th, 1888.

Capilano Waterworks.

Through the courtesy of Mr. F. Little we were permitted to take a trip this morning at 6:30 a. m. on board the Saturna to the point situated at the mouth of the Capilano river at which the scaffolding is now being erected for the purpose of shooting pipes across the Narrows. "All aboard," shouted Mr. Little, and soon Capt. Wessell, for Capt. Pike is now up at Kamloops, had the bow of the little vessel headed for the Narrows. Little by little (this is not meant for a pun) the wharf, the buildings, the depot and the other vessels faded away in the distance—the town looking like a second San Francisco as it lay stretched along the shore, still covered with a slight mist which the morning sun was beginning to disperse. Soon the Burnaby rock was passed and shortly the scaffolding came in sight. Then the little vessel went like lightning for the tide was running out at the rate of quite 15 miles an hour. The trip out had been made in 15 minutes. The Saturna went a little beyond the scaffolding and then headed straight up the Inlet, when the men on board got ready to get into the little boat attached, and soon after dropped astern and slid down gently with the tide to the scaffolding. This manoeuvre was repeated until all were placed on the scaffold and then the Saturna started straight back. The scaffold, which Mr. J. E. Ward, the contractor, is putting up, consists of two portions attached to each other, one of which is about 8 inches by 24 feet, the second 15 by 10. The scaffolding rests on mud

sills and is well braced, although there is scarcely any water there at low tide. The flexible piping, which is already at the spot, will be delivered at one portion of scaffolding, and then leaded and jointed, and then shot down the other portion of the scaffolding, to which a suitable sloping platform will be built. The men are now busy building a chimney, rails, and putting down a plank platform. The lumber is all there, but a good deal of work is still required before the blocking and tackle and other necessary apparatus are fixed ready for use. A pile-driver will probably be used to raise the pipes with.

On her return trip the Saturna took 25 minutes having to contend with a strong out-going tide, reaching the City wharf at a quarter to 3, where she waited for Mr. Ward, who came down shortly afterwards and went off to superintend the work.

We have instructed the City Engineer to examine and report upon the following:

1. On the petition of Chas. Chamberlin for the improvement of Nelson street from Granville street to Hornby street, and Howe street from Nelson street to Helmcke street.

2. On the most necessary locations for surface drains.

3. On the position of the pipes of the Vancouver Water Works Co.

4. On the improvement of Prior street from Granville street to the tank on said street.

F. C. Innes has petitioned this Board to lower the grade of the sidewalk on Hastings street opposite block 1, district lot 541. We recommend that no alterations be made, as all the sidewalks are now laid to their proper grade.

The street railway question has again been considered by this Board. We have decided to refer the matter back to Council to be taken up and discussed in committee of the whole.

H. BELL-IRVING,
Chairman.

The men employed at the Vancouver City Foundry and Iron Works, of whom there are about twenty at present, are kept very busy. The manager at the works, Mr. McKelvie, states that as yet they have not been able to get all the machinery fixed and in working order, but that it will not be long before things are quite in shape. To-day a large number of iron rods were turned out for use in Mr. J. E. Ward's contract, which are so constructed as to be able to be fixed to one another, making one rod about 2,000 feet long and weighing in all at least six tons. The flexible-jointed piping to be placed across the Narrows will be threaded on this rod, jointed together piece by piece, until the whole is laid in its proper position on the bottom. The iron works are also making the wheels for the pulley blocks for Mr. Ward's contract, the cresting for the new General Hospital, castings of wheels for the C. P. R., and various kinds of casts from moulds, the cupola being kept in full blast. The sand used is of good quality and comes from False Creek. A large addition, which is not quite out of the carpenter's hands, has been placed in rear of the furnace, and will be used for the saws and designs for the castings, mouldings, etc. The firm have a number of orders on hand, and expect to turn out a great deal of work this summer. The exterior of the works is being painted all over with fire-proof paint of a deep red color, cars of material lie side-tracked in front of the works, and, altogether, every detail about the works seems to be carried on in a most business-like manner.

The 1800 feet of iron rod for Mr. Ward, the contractor for laying the pipe across the Narrows, has been completed by the Vancouver City Iron Works, and was taken across to the scene of operations last evening. It is expected that the work of laying the pipe will be commenced about next Monday.

VANCOUVER WATER WORKS.

TENDER FOR WORK.

....., the undersigned, do hereby agree to furnish the necessary plant, labor and material for the proper performance and fulfilment of the work of TUNNELLING, EXCAVATING AND REFILLING TRENCH, and the DISTRIBUTION OF PIPES, ETC., along side of trench on the line of the Vancouver Water Works, between the north shore of Burrard Inlet and the Capilano Dam, some 6½ miles, at such times and in such manner as may be directed, and to complete the same in full accordance with the specification and to the satisfaction of the Engineer in charge or person he may appoint, for the prices set opposite each item in the following Schedule of approximate quantities, on or before the First day of August, 1888.

SCHEDULE.

DESCRIPTION OF WORK.	QUANTITIES.		RATE.	AMOUNT.
TUNNELLING:				
6 x 4 ft. in Solid Rock	L. Ft.	300		
Excavation of approaches to same in Solid Rock	C. Yds.	100		
EXCAVATION AND REFILLING OF PIPE TRENCH:				
STA. 14 to 27. In hard-pan and mud between low and high water mark, north shore of Inlet, 5,300 lineal feet.....	"	500		
STA. 27 to 80.—In earth and hard-pan on flat, 5,300 lineal feet	"	3,500		
STA. 80 to 144.—In solid rock on flat, 6,400 lineal feet	"	1,500		
Do., do.—Refilling same and forming earth embankment over trench, 6,400 lineal feet.....	"	7,000		
STA. 144 to 217 x 68.—In earth on side hill, 7,568 lineal feet.....	"	7,500		
STA. 217 x 68 to 354 x 75.—In earth, hard-pan and boulders on flat, 13,707 lineal feet	"	9,250		
DISTRIBUTION OF PIPES, ETC.:				
STA. 14 to 27.—Hauling and distributing along line of trench, ready for laying, 1,280 lineal feet of 12 inch mains, in lengths of 23 feet, weighing 38 lbs. per foot run, and about 1 ton of lead for same	Tons.	23		
STA. 27 to 217 x 68.—Hauling and distributing along line of trench, ready for laying, 20,000 lineal feet of 16 inch mains, in lengths of 23 feet, weighing 24 lbs. per foot run, including joint sleeves and some 18 tons of lead for same.....	"	225		
STA. 317 x 68 to 354 x 75.—Hauling and distributing as above, 13,800 lineal feet of 22 inch mains in lengths of 23 feet, weighing 32 lbs. per foot run, including joint sleeves, and some 18 tons of lead for same	"	215		
TOTAL				

Signature of Contractor _____

Address _____

Vancouver, B. C,

May, 1888,

Vancouver Water Works.

TENDER FOR WORK.

..... the undersigned, do hereby agree to furnish the necessary plant, labor and material for the proper performance and faithful execution of the work of TUNNELLING, EXCAVATING AND REFILLING TRENCH, and the DISTRIBUTION OF PIPES, ETC., along side of trench on the line of the Vancouver Water Works, between the north shore of Burrard Inlet and the Capilano Dam, some 6 1/2 miles, at such times and in such manner as may be directed and to complete the same in full accordance with the specification and to the satisfaction of the Engineer in charge, or person he may appoint, for the prices set opposite each item in the following Schedule of approximate quantities, on or before the First day of August, 1888.

SCHEDULE.

STATION.		DESCRIPTION OF WORK.	QUANTITIES.	RATE.		AMOUNT.	
FROM	TO					Dollars.	Cents.
		TUNNELLING:					
		6 x 4 feet in solid rock.....	300				
		Excavation of approaches to same in solid rock.....	C. Yds. 300				
		EXCAVATION AND REFILLING OF PIPE TRENCH:					
12 x 76	19 x 00	In hard-pan and mud below high water mark, north shore of Inlet, 624 lineal feet.....	" 256				
19 x 00	27 x 00	In earth and water, below high water mark, 800 lineal ft.	" 328				
27 x 00	48 x 00	In earth, small boulders and hard-pan, lineal ft. 2,100...	" 1,323				
48 x 00	70 x 00	In earth and sand, lineal ft. 2,200.....	" 1,320				
70 x 00	87 x 00	In gravel, hard-pan and boulders, lineal ft. 1,700.....	" 1,054				
87 x 00	91 x 00	In earth and boulders, lineal ft. 400.....	" 252				
91 x 00	105 x 00	In earth, boulders and hard-pan, lineal ft. 1,400.....	" 882				
105 x 00	122 x 00	In earth and boulders, lineal ft. 1,700.....	" 1,071				
122 x 00	128 x 00	In sand, clay and water, lineal ft. 600.....	" 373				
128 x 00	131 x 50	In gravel and boulders, lineal ft. 350.....	" 221				
131 x 50	134 x 00	In earth and sand, lineal ft. 250.....	" 158				
134 x 00	144 x 00	In earth, hard-pan and boulders lineal ft. 1,000.....	" 630				
144 x 00	215 x 50	In earth, boulders and gravel, lineal ft. 7,150.....	" 4,410				
215 x 50	217 x 68	In solid rock, lineal ft. 218.....	" 97				
221 x 00	235 x 00	In earth and boulders, lineal ft. 1,400.....	" 1,230				
235 x 00	241 x 00	In sand and boulders, lineal ft. 600.....	" 540				
241 x 00	259 x 00	In earth, gravel and boulders, lineal ft. 1,800.....	" 1,020				
259 x 00	272 x 00	In sand and boulders, lineal ft. 1,800.....	" 1,170				
272 x 00	274 x 00	In Boulders, lineal ft. 200.....	" 180				
274 x 00	278 x 00	In earth, gravel and boulders, lineal ft. 400.....	" 360				
278 x 00	289 x 00	In earth, boulders and hard-pan, lineal ft. 1,100.....	" 380				
289 x 00	297 x 00	In clay, gravel and boulders, lineal ft. 800.....	" 720				
297 x 00	307 x 00	In earth, boulders and hard-pan, lineal ft. 1,000.....	" 900				
307 x 00	312 x 50	In boulders, lineal ft. 550.....	" 395				
312 x 50	321 x 60	In sand, hard-pan and boulders, lineal ft. 910.....	" 819				
321 x 60	324 x 00	In boulders, lineal ft. 240.....	" 126				
324 x 00	354 x 75	In earth, sand and boulders, lineal ft. 3,075.....	" 2,767				
		Amount Carried forward.....					

(1688)

11-7

SCHEDULE, Continued.

STATION.		DESCRIPTION OF WORK.	QUANTITIES.		RATE.		AMOUNT.	
FROM	TO				Dollars.	cents.	Dollars.	cents.
		Amount Brought forward				\$		
		EMBANKMENTS:						
		Over pipes at various points, say	C. Yds.	1,000				
		CULVERTS:						
		Close fitted timber culverts enclosing pipes at Stas. 273, 309, and 322, and under various streams, including earth packing round pipes	L. Ft.	1,200				
		Boulder and gravel filling above and around same cribs, say	C. Yds.	1,300				
		DISTRIBUTION OF PIPES, ETC.						
14 x 20	27 x 00	Hauling and distributing along line of trench, ready for laying, 1,280 lineal feet of 12 inch mains, in lengths of 23 feet, weighing 38 lbs. per foot run, and about 1 ton of lead for same, say	Tons	25				
27 x 00	217 x 68	Hauling and distributing along line of trench, ready for laying, 20,000 lineal feet of 16 inch mains, in lengths of 23 feet, weighing 24 lbs per foot run, including joint sleeves, and some 18 tons of lead, for same, say	"	235				
217 x 68	354 x 75	Hauling and distributing as above, 13,800 lineal feet of 22 inch mains, in lengths of 23 feet, weighing 32 lbs. per foot run, including joint sleeves, and some 18 tons of lead for same, say	"	220				
		Total Amount ..				\$		

Signature of Contractor

Address

Vancouver B. C.,

..... May 1888

COUNCIL PROCEEDING

(Continued from 1st page)

(4) That the Vancouver Water Works Co.'s pipes be placed in the position as per memorandum attached.

(5) That a water tank be constructed at the corner of Georgia and Thurlow sts.

(6) That the following accounts be paid:—W. Beavis, iron stakes, \$18; Dunn & Ferguson, street work, \$11.20; John Lovett, street work, \$19; Thos. Dunn & Co., nails, etc., \$3.85; Brunette Saw Mill Co., 53cts.

That tenders be called forthwith for the construction of the proposed bridge across Coal Harbor.

H. BELL-IRVING,
Chairman.

Ald. Oppenheimer objected to the adoption of the report until it had been discussed by the Council, and they had decided on the plan and letter annexed.

Ald. Bell-Irving explained that all that was intended was to give permission to the Water Company to lay the pipe. After considerable discussion the report was agreed to independently of the plan and letter and was adopted with a memorandum attached as to the placing of the pipes.

The report was adopted on motion of Ald. Clark seconded by Ald. Alexander.

Yesterday Mr. Ward succeeded in getting a rope stretched across the Narrows on the line that the pipe line from the north shore of the Inlet will be taken. He also in the afternoon commenced the work of laying across the Narrows, the iron rod, the work on which is the immediate preliminary of the submergence of the pipes themselves. The rod, as has been before mentioned, is in sections. As a length of pipe is let down and pushed across from the north shore, so a corresponding section of the iron rod is uncoupled and taken off at the southern end. It is probable that the work of laying the rod will be completed by to-morrow or Thursday when pipe laying will be commenced, and, if nothing unforeseen occur, this will probably be all done within two weeks.

An Engineering Problem.

Yesterday, says the Vancouver News-Advertiser of the 16th inst., Mr. Ward succeeded in getting a rope stretched across the Narrows on the line that the pipe line from the north shore of the Inlet will be taken. He also, in the afternoon, commenced the work of laying across the Narrows, the iron rod, the work on which is the immediate preliminary of the submergence of the pipes themselves. The rod, as has been before mentioned, is in sections. As a length of pipe is let down and pushed across from the north shore, so a corresponding section of the iron rod is uncoupled and taken off at the southern end. It is probable that the work of laying the rod will be completed by to-morrow or Thursday, when pipe-laying will be commenced, and, if nothing unforeseen occurs to hinder, this will probably be all done within two weeks. The success of this engineering problem is being watched with great interest. The pipe line will cross the Narrows from the dam on the Capilano river near the Indian village at the mouth of that stream, touching the government reserve on the east side of the Inlet about half a mile below the city. The main pipe will then be laid along Georgia street to Granville street, thence to Hastings street. From these streets service pipes will branch out in every direction. The dam is 160 feet above the highest elevation in the city. No fear is apprehended for want of a good head or supply which is said to be a never failing one. The water is of the very best quality. So that Vancouver will enjoy the advantage of a water supply service unrivalled anywhere.

(4) That Vancouver Water Works Co.'s Pipes be placed in a position as per memorandum attached.

(5) That a water tank be constructed at the corner of Georgia and Thurlow sts.

(6) That the following accounts be paid:—W. Beavis, iron stakes, \$18, Dunn and Ferguson, street work, \$11.20; John Lovett, street work, \$19; T. Dunn and Co., nails, etc., \$3.85; Brunett Saw Mills Co., 53cts.

That tenders be called forthwith for the proposed bridge across Coal Harbor.

H. BELL-IRVING,
Chairman.

Ald. Oppenheimer objected to the clause in the report which referred to the plan and letter of the Waterworks company, relating to the laying of pipes, stating that he thought that part of it could not be dealt with at that meeting; that the Waterworks Co. had only permission to lay pipes, and therefore he objected to the mention in the report of the plans and letter submitted by them, as, when the report was adopted, it would be virtually adopting the plan and letter of the Vancouver Waterworks Company on the subject also.

Ald. Bell-Irving thought Ald. Oppenheimer had mistaken the meaning of the clause in the report, that all that was intended was to give the Vancouver Waterworks Company permission to lay the pipes; that no reference was made to the position of the hydrants; the intention being merely to allow the Company to lay the pipes in the position they wanted to; that several urgent reasons had been brought to his notice since the meeting of the Board of Works why the Company desired to do so in the positions indicated on their plans.

Ald. Oppenheimer said he did not agree with Ald. Bell-Irving. He emphatically objected to the clause "Subject to the plan and letter," being inserted.

The Mayor then read portions of the report relating to the clause in dispute.

Ald. Bell-Irving said he did not quite understand what Ald. Oppenheimer wanted done.

Ald. Oppenheimer said he was not prepared to give a definite opinion as to the position the pipes etc. should be laid, until the other Aldermen had given their opinion on the subject.

Ald. Clark thought it advisable to submit the matter to the council in committee of the whole.

Ald. Oppenheimer thought the clause relating to the plan and letter should be erased before the matter came up before a committee of the whole.

Ald. Bell-Irving said he could not state definitely from memory the exact distance at which it was intended by the company to lay the pipes. From the reasons brought to his notice since the meeting of the Board of Works, he thought the Water Works Company's plans were correct as to distances and that the positions decided upon by them had relation to the macadamizing and grading of the streets at any future time or the widening of the street walks and the connection of the stop-cocks with the hydrants and mains, and that he considered that the Waterworks Company's engineer was about correct in his estimate.

Ald. Clark thought it a good idea to lay pipes at even distances along all streets but did not approve of the wording of the report.

Ald. Humphries said that on thinking the matter over, to the best of his recollection, nothing was agreed upon at the meeting of the Board of Works except to grant the Waterworks Co. the privilege to build their pipes at the distances stated by them, and that the position of the hydrants and the plans was not accepted.

Considerable discussion then took place on the subject.

Eventually it was decided to amend the report as follows:

In place of the phrase "subject to the plans and letter" it was agreed to insert the following words "as per memorandum attached," which corrections was accordingly made.

The report was adopted on motion of Ald. Clark seconded by Ald. Alexander.

Although irrigation is necessary on the high lands in the interior of the province, yet on the coast we have an abundance of moisture and our farmers are not dependent on artificial means of that kind to raise their crops. But for domestic purposes, for the water necessary for the people of our cities there is no source of supply so good, no place where can be obtained pure, sparkling water of such an excellent quality as that derived from the mountain torrents that head far up in the recesses of the lofty mountain ranges that gird our shores. Vancouver shortly will be furnished with such a supply by the Vancouver Water Works Company. In another column will be found a detailed description of the dam which the Company has constructed across the Capilano river on the north side of the Inlet. Not only by our own citizens, but by the people of the Dominion, who watch with interest and surprise the astonishing growth of Vancouver, will this account of an important enterprise be read as an evidence of the permanent character of the improvements which are being made. Probably but few of our readers have ever seen a work of this description, and during the summer it may afford a pleasant excursion to cross the inlet and visit the dam, which is about six miles from the shore over the trail cut by the company. The principle on which the dam is constructed is one which is well known and which has been successfully adopted in the construction of other structures of the same character in other places. The massive timbers of which the dam is built, being always wet become hard and practically indestructible, and will endure for many years. The skillful way in which the structure was designed, and the substantial manner in which the work has been executed, reflect great credit on the

engineer and the contractors, who are all citizens of this place. With the works completed, and giving the city an abundant supply of pure water, with the excellent gas, electric light and telephone systems which we already possess, we think Vancouver may well feel proud of the enterprise of the gentlemen of this city and Victoria who have originated and carried out so thoroughly the various undertakings we have enumerated.

The Jan Baas, one of the ships bringing the iron pipes for the Capilano Water Works, is expected to arrive at Victoria any day now.

NEWS-ADVERTISER.

THE WATER WORKS.

Interesting Description of the Dam Across the Capilano River.

The dam, just completed by the Vancouver Waterworks Company at their point of supply on Capilano River, is the first structure of the kind, of any magnitude ever built in the Province, and a few details of its construction will be of interest to the readers of the News-Advertiser.

The site of the dam was located in July 1886, at a distance of six and one sixth miles up stream from the mouth of the river on the First Narrows of Burrard Inlet, the low water level at this point being 406 feet above tidal level. At this point the river flowed over a bed of huge granite boulders, at the rate of $\frac{1}{4}$ feet per second, discharging at lowest known level four hundred and forty millions of gallons every 24 hours. The width at ordinary high water was 180 feet, and the greatest depth 9 feet. The west bank rose abruptly to a height of 23 feet above the river level, and then extended in an almost level flat a considerable distance inland. The east bank was low and shelving for a distance of 150 feet inland, and then rose with a steep slope to an elevation of 37 feet above the river level.

The dam, which now crosses the river at this point, consists of six principal parts, viz: The extension of the east abutment over low lying land, the east abutment with its well chambers, settling pond and pipe outlet, the spillway or tumbling way, the west abutment, the sluiceway and the sluiceway abutment. The extension of the east abutment is 156 feet long, 10 feet wide and 8 feet deep. It consists of three rows of parallel longitudinal timbers 15 inches diameter, crossed at intervals of 5 feet by cross ties of same diameter, the whole being built course by course to a height of 8 feet above foundation level. The timbers, which are notched and fitted into each other, are connected by $\frac{1}{2}$ -inch wrought iron drift bolts, 30 inches long. The spaces or cribs formed by the crossing of the timbers, are filled up with boulders large and small, firmly packed together with coarse gravel. The up stream face is protected from percolation by two inch and one inch sheet piling, laid vertically one over the joints of the other, and sunk to a depth of three feet below foundation level. At the extreme end of the extension, where the connection with the high land is made, this sheet piling is covered in a distance of 60 feet by an embankment of stone and gravel. The east abutment is 41 feet long, 20 feet wide, and 18 $\frac{1}{2}$ feet high. This also is built of round timber logs, 15 inches diam. crossing each other at regular intervals, and firmly bolted at each intersection. The cribs thus formed are 28 in number, and have been most carefully filled with broken rock and boulders, rammed and packed together so as to form an almost homogeneous mass. The well chambers, by means of which the water from the reservoir formed by the dam will be conveyed into the mains, are located in the centre of this abutment. A large tank, walled with double 2 inch planking on all four sides, and divided in the middle by two parallel walls 4 inches apart, forms these chambers. Each chamber is 7 feet 10 inches long, 4 feet 9 inches wide, and 17 feet deep. The water

is conveyed from the reservoir in front of the dam through a coarse wrought iron grating, 4 inch meshes, into a 3 by 3 planked conduit 15 feet long, through which it passes into the first chamber, and thence, through two fine copper wire screens, 3 feet by 3 feet, attached to sliding frames between the central walls, into the second chamber, and thence into the double 22 inch mild steel rivetted mains. The entrance conduit and the outlets into the mains are provided with timber gates, by means of which the water can be shut off when desired. Above the chambers is a compact house, 12 feet by 13 feet, built of squared 12 by 12 timbers. This house serves as a protection against any outside interference with the machinery of the well chambers and also as a place of observance for the care-taker in the flood season. The front of the abutment is double sheet piled with 1 inch and 2 inch planking, sunk in a bed of concrete. The rear, and also the west face, which is exposed to the water passing over the spillway, is planked with single 3 inch planking. In front of the abutment, and extending into the Reservoir, is a V shaped settling pond, 23 feet long, 10 feet deep, and 20 feet wide at the base. Any heavy matter, such as gravel or small stones, which may be in suspension in the river water when it reaches this settling pond will sink to the bottom, and thus only pure water will enter the well chambers and be thence discharged into the mains. At the rear of the abutment the outlet mains are protected by heavy crib work, extending over a distance of 120 feet, at which point a safe connection with the earth flat is made.

The Tumbling Way is 165 feet long, 41 feet wide, and 12 feet high. The middle section is vertical in front and rear for $\frac{1}{4}$ feet from foundation level. The front face then slopes upward to the ridge at the rate of 2 feet, 3 $\frac{1}{2}$ inches, to one. The ridge, which is at an elevation of 415 feet above tidal water, is 17 feet from the face, and 12 feet above foundation level. The rear slope extends downwards from the ridge at the same rate as the front slope, but stops at a distance of 12 feet from the rear face. Here a level bench 12 feet wide extends throughout the length of the tumbling way. At foundation level, a platform of 15 inch logs extends down stream from the rear face, a distance of 12 feet, forming a solid apron, capable of resisting the force of the water falling over the tumbling way, and protecting the river's bed from any scour in the vicinity. The body of the tumbling way, like the abutment, is composed of 15 inch logs, placed longitudinally and cross ways, forming no less than 196 cribs, which are compactly loaded with stone filling. The timbers are bolted together with $\frac{1}{2}$ inch wrought iron bolts, and are flatted on the front and end faces, and dovetailed at the corners.

To avoid the necessity and enormous cost of diverting the river for the purpose of construction, the tumbling way was designed with a row of horizontal apertures, 28 in number, 5 feet wide, 12 inches deep, and extending entirely through the structure to the open river in the rear. During construction, when the difficulties of excavating the foundations and laying the first two courses were overcome, the water flowed through these openings, and thus the work above was completed without interruption. The vertical part of the face of the tumbling is protected by double 1 inch and 2 inch sheet piling, set in a trench filled with concrete, the concrete being in the proportion of 5 of coarse

gravel and sand to 1 of Portland cement. When this sheet piling was put in place, the horizontal apertures were effectually closed. The front slope is faced with 3 inch planking, the upper half being double. The rear slope and rear bench are also protected by single 3 inch planking. In addition to the protection afforded by the front sheet piling, an embankment of stone and gravel has been placed in the extreme front of the tumbling way. This embankment commences half way up the front slope, and from this point falls at the rate of 3 feet to 1 till it meets with the original bed of the river. The east abutment is 41 feet long, 15 wide, and 18 $\frac{1}{2}$ feet high. It is solid throughout, being built of 15 inch timbers securely bolted together, and having compact boulder and gravel filling in all its cribs, which are 21 in number. It is sheet piled in front and planked on the rear and east and west faces with 3 inch planking.

The sluiceway has a clear opening of 14 feet. From wall to wall it is 15 feet wide, and at the upstream end is the full height of the abutments. Both walls and floor are planked with vertical 3-inch planking. Under the floor planking are 12-inch sills laid close and bolted to the abutments on each side. Five of these sills are 43 feet 6 inches long and extend under both abutments. Similarly 2 cross ties extend over the abutments on top. When not in use the sluiceway is closed by 17 stop logs, 12 inches square and 17 feet 4 inches long, which are kept in position by 2 double sets of 12-inch square uprights attached to the walls, and one double set of the same dimensions placed in the middle. These stop logs will be raised separately when necessary, by means of a powerful windlass. Each is fitted with a stout wrought iron ring, to which chains attached to the windlass will be connected by means of a hook specially made for the purpose. The sluiceway abutment is built in steps. At the upstream end it is 18 $\frac{1}{2}$ feet high and 13 feet wide, while at the extreme rear (which projects beyond the rear of the tumbling way a distance of 28 feet) it is only 5 feet high and 8 feet wide. This abutment is also built of 15-inch timbers securely bolted and heavily loaded in all its cribs with compact stone and gravel filling.

Thus it will be seen that the extreme length of the dam from land connection to land connection is 385 feet, the clear tumbling way 165 feet, with an additional 14 feet of sluiceway when required, and the breadth of the principal parts 41 feet. There were used in its construction: 33,543 lineal feet of round and flatted timber, 1,067 lineal feet of squared timber, 67,700 feet b. m. planking and sheet piling, 18,217 lbs. wrought and cast iron bolts, nails, spikes and washers, 2,441 cubic yards of stone filling, 50 cubic yards of concrete, 79 cubic yards of rip rap. The excavation in foundations amounted to 1877 cubic yards, and the embankments to 304 cubic yards.

Work was commenced on the 30th of January, 1888, and completed at a cost of over \$15,000 on the 18th of April last.

From the above details it will readily be seen that a work of no ordinary magnitude has been successfully completed, and which reflects credit not only on all those concerned in its construction, but also on the city of Vancouver itself. With the completion of this dam and reservoir, and the laying of the submerged mains across the first narrows, now being commenced, the City of Vancouver may rely on having a speedy and plentiful supply of the purest water, and a system of water works unequalled on the Pacific Coast.

Office of

The Vancouver Water Works Company.

John Irving,

President,

J. W. MacFarland,

Secretary.

Vancouver, B. C.

Vancouver's Water Works.

The *News-Advertiser* of last Thursday contains a detailed description of the dam erected on the Capilano river by the Vancouver Water Works Company. The extreme length of the dam from land connection to land connection is 385 feet, the clear tumbling way 165 feet, with an additional 14 feet of sluiceway when required, and the breadth of the principal parts 41 feet. There were used in its construction: 33,543 lineal feet of round and flatted timber, 1067 lineal feet of squared timber, 67,700 feet b. m. planking and sheet piling, 18,217 lbs wrought and cast iron bolts, nails, spikes and washers, 2441 cubic yards of stone filling, 50 cubic yard of concrete, 79 cubic yards of rip rap. The excavation in foundations amounted to 1877 cubic yards, and the embankments to 304 cubic yards. Work was commenced on the 30th of January, 1888, and completed at a cost of over \$15,000 on the 18th of April last. From this it will readily be seen that a work of no ordinary magnitude has been successfully completed, and which reflects credit not only on all those concerned in its construction, but also on the city of Vancouver itself. With the completion of this dam and reservoir, and the laying of the submerged mains across the first Narrows, now being commenced, the city of Vancouver may rely on having a speedy and plentiful supply of the purest water, and a system of water works unequalled on the Pacific coast.

The Waterworks.

The work of laying the pipes across the Narrows is, now being carried on assiduously by those engaged in the contract, a number of pipes being already jointed and placed on the bottom. The pipes are 12 feet long and 12 inches in diameter. A furnace at which the lead is melted, is situated on one side of the scaffolding. As soon as a pipe is required it is hauled up to the eastern end of the scaffolding, placed in position and jointed with lead in such a manner as to be perfectly watertight and to last for years. This operation, which does not take very long if all the necessary appliances are at hand, being completed, the whole of the piping already jointed is pressed forward down a sloping platform, thus making room for the next pipe. The iron rod, which is used for drawing the piping across, and which is in sections, is 1 inch in diameter and about 2,000 feet long, and capable of extending from the scaffold on the north side of the narrows to that on the south. Mr. E. Little, who is superintending the laying of the pipes for Mr. J. F. Ward, the contractor, states that it is impossible at the present state of the work to tell how long the actual laying may yet take, but, provided no rocks are encountered or other obstacles come in their way, there is every reason to expect the whole of the pipes will be permanently laid across the Narrows within two or three weeks from this date. The pipes for the portion of the work from the dam to the Narrows and from the latter throughout the city are expected to arrive any day now, Mr. McFarland, Secretary of the Capilano Waterworks Co., stating that they expect an advice of their arrival at any time. They were shipped from England last January. A 16-inch pipe will conduct the water from the canyon below the dam, which is 125 feet in width, to the Narrows, a distance of six miles. On one side of the dam there is a flume by means of which the water can be raised or lowered at will. On the other side the water passes into a well, then through a series of screens, passing through a 22-inch pipe until it reaches the 16-inch pipes at a point in the canyon below. The 12 inch pipes are laid double across the Narrows. A 16-inch pipe will carry the water from the Narrows to the foot of Georgia street, from which point 12-inch mains will distribute the water throughout the city. It is hoped that the work will be completed by about August or September next.

Mr. Ward having completed all the preliminary work on the preparations for the pipe line across the Narrows, has now commenced on the laying of the pipes themselves. Eight lengths have been successfully laid, and unless any accident or unforeseen circumstance should occur, the whole line will be completed in about 8 days. There are 105 separate lengths in all.

Mr. H. B. Smith, C.E., and party left yesterday to make the final surveys, put in the stakes etc., for the pipe line from Capilano dam to the shore of the Narrows for the Vancouver Water Works Company. Tenders for the work of laying the pipe etc. will be received by the secretary of the company until next Friday noon.

The barque Camana has arrived at Victoria from Glasgow with 350 tons of cast iron pipes for the distribution system of the Vancouver Water Works. The other ships containing the remainder of the pipe and the steel for the mains are expected in a few days. Mr. J. W. McFarland, the secretary of the company, left for Victoria yesterday.

The Nellie Taylor took over a number of empty barrels to be used in assisting in the work of laying the submerged pipes across the Narrows in connection with the Waterworks, the laying of which pipes it is expected will be concluded within ten days. The Nellie Taylor also brought over lumber for Mr. A. C. Thicke's new residence, on Powell st.

Mr. J. McFarland, manager of the Waterworks, has returned from Victoria, and states the cast iron pipes received at the Hudson Bay Store in the city by the Camana will be delivered in Vancouver in a day or two. The men engaged on Mr. Ward's contract went over as usual this morning.

The Waterworks.

In an interview with Mr. Monteith, who is acting as manager and secretary pro tem, during the absence of Mr. McFarland, who has gone to Victoria for a few days, that gentleman stated that the cast iron pipes which have just arrived at Victoria will be transhipped from that port to Vancouver as soon as possible. They arrived in Victoria per barque Camana, the cargo being shipped at Glasgow and consisting of about 350 tons of cast iron pipes. The Barque is expected to arrive at Victoria in a few days with a consignment of steel piping for the mains to be laid between the dam on the Capilano and the Narrows. Mr. McFarland should return about Friday next, up to which date tenders will be received for carrying out the work by contract. We understand the work of putting in the stakes and locating the line for the pipes is now being carried on. This will be the final survey. On Mr. J. F. Ward's contract, very good progress is being made, no obstructions having as yet been encountered. The cast iron pipes just arrived will be held in readiness for laying throughout the city, as soon as the steel pipes have been laid from the dam to the Narrows and connected with the submerged pipes.

This morning at about 11 a. m. the tug Nellie Taylor took over on a scow the wire rope which has just arrived from Nanaimo for Mr. Ward's contract on the Narrows, and which is about 900 feet in length. Mr. F. Little and a number of his men went over with her. A diving apparatus is fixed on the scow. The divers commenced work this afternoon.

A new rope has been received from Nanaimo for use on Mr. J. F. Ward's contract at the Narrows. Mr. Ward states that everything is going on satisfactorily with the work. At the present stage of work it is impossible to tell how soon all the piping will be laid across the Narrows but it is expected that this part of the work will be completed within a week or two. The men row over in boats every morning to the scene of operations. The pipes which arrived at Victoria a few days ago by the Camana consigned to that port for the Vancouver Water Works Co. have not as yet been transported to this city but are expected to arrive at any time.

It is expected the cast iron pipes for the use of the Capilano Waterworks, which arrived at Victoria by the Camana, will be brought to this city by the steamer Maude in the course of a few days. Mr. J. McFarland, the manager for the company, stated, during a few minutes conversation, that as yet the pipes for the mains have not arrived, being on their way by another vessel, the pipes already brought by the Camana being merely distribution pipes for use throughout the city.

Work on Mr. Ward's contract at the Narrows is progressing favorably. Mr. F. Little, who through indisposition has been unable to attend to the work for the last two days was out as usual this morning superintending the pipe-laying. No definite date can yet be given for the completion of the work.

(1904)
Advertiser, July 18th

Mr. Monteith, we are led to understand, has severed his connection with the Vancouver Waterworks Co.,

The wire cable in connection with the Ward contract in the Narrows is stretched across ready for use.

Ward's News

We are requested to state that Mr. Monteith has not severed his connection with the Waterworks Company of this city.

THE WATER WORKS.

The constant addition to the city's population, the new houses which are going up on every side, make the importance of a liberal supply of good water more apparent every day. Numerous wells have been sunk with varying success. In some localities a fair supply of water of good quality has been got, while in other places the results have been very unsatisfactory. Under these circumstances it is not surprising at the keen interest which is manifested in the progress being made on the works to supply the city with water from the Capilano river. The chief work at present being done by the Water Works Company is on the pipe line across the narrows. It was anticipated that this operation would have been completed before this, but considerable delay has been caused by the difficulty in getting a proper cable for the hauling of the pipes across the Narrows, the appliances which were used in view of the difficulty of getting a cable here quickly not proving satisfactory. A wire cable has, however, now been obtained from Nanaimo and the work is proceeding satisfactorily, and it is expected there will be no further detention. Out of the 105 lengths of pipes about 20 have been laid, and the work is progressing at the rate of from 5 to 10 per day, according to the state of the tide. Mr. Ward, who has the contract for this portion of the works, has been suddenly called to St. Paul, Minn., on business connected with a large contract which he has there, and while he is away Mr. F. Little will have charge of the work which will not be delayed on account of Mr. Ward's absence.

Ward's News

Capt. Harmon will go over to Vancouver to assist in the laying of the submarine pipes in the first Narrows for the Capilano-Vancouver water works.

Mr. J. W. McFarland, secretary of the Vancouver Water Works Co., yesterday received a telegram from Welch, Rithet & Co. stating that the steel plates for the mains had arrived at Victoria that morning. These plates will be rolled into pipes 16 inches in diameter and double-riveted.

The Directors of the Vancouver Water Works Company were in the city yesterday and by Tuesday next it is anticipated that all arrangements will be made for the whole of the work necessary to enable the company to supply the city with water. From what is learned there is no question that the works will be in full operation by September next.

Capt. Hammond, the diver, left for the Narrows as usual this morning, and is hard at work. Under the superintendence of Mr. F. Little, who has entire control of the work of laying the flexible iron pipes during the absence of Mr. Ward in the east, is, we are glad to see, getting over his recent indisposition. About 25 pipes are now laid in position, there being about 150 lengths of pipes necessary to complete the distance across the Narrows. The new cable, received from Nanaimo is stretched across from shore to shore, and it is expected no detention or delay will take place and the work carried on with rapidity to completion.

Advertiser, June 20th

Capt. Irving, and Messrs. R. P. Rithet and D. M. Eberts, directors of the Vancouver Water Works, were in the city yesterday on business connected with the company.

Finished Discharging.

The German bark Janbaas has about finished discharging her cargo of water pipes, boiler plates and other iron material. Welch, Rithet & Co.'s wharf, where the vessel is berthed, is covered from end to end with the iron pipes, and anyone looking at the vast pile would scarcely conceive it possible that they could all be stowed away in the vessel's hold.

The Waterworks.

A meeting of the directors of the Vancouver Waterworks Company took place yesterday at Mr. Keefer's office, among those present being Capt. John Irving, President of the company, Mr. Earle, Mr. R. P. Rithet, Mr. J. W. McFarland, Secretary and Manager and others. The object of the meeting was to arrange matters so as to continue the work of laying the pipes across the First Narrows and to commence the work from the Narrows to the dam, a distance of 6 miles; for which portion tenders have been recently called. The contract will, we understand, be let in a few days, and the whole matter definitely settled by the 3rd or 4th of July. The city will probably be supplied with Capilano River water in about three months.

The Waterworks.

The contract for laying the pipes for the Waterworks, from the Narrows to the Dam, about six miles, and also across the Narrows, has been awarded to Messrs. Keefer and McGillivray of this city, who will commence work on Monday next. We understand that Mr. J. Ward, who lately left for St. Paul, Minn., has severed his connection with the Vancouver Waterworks. Mr. McFarland, the secretary and manager, arrived from Victoria on the Yosemite to-day.

THE WATER WORKS.

A contract was let yesterday to Messrs. Keefer & McGillivray by the Vancouver Water Works Company for the completion of the whole of the works to bring water from the Capilano River. The contract covers the whole of the work on the north side of the Inlet, the completion of the laying of the pipe across the Narrows and on this side to a point where the distribution system commences. The whole of the contract is to be completed within three months from date. The contractors expect to have the work at the Narrows finished within two weeks. It is to be hoped that the fact of this contract having been let will once and for all stop the foolish but at the same time injurious statements which have been so industriously circulated by certain parties that the work had been indefinitely postponed, if not altogether abandoned.

Advertiser, July 18

Messrs. Keefer & McGillivray are making good progress with the preparations for laying the pipes across the Narrows. They will commence the work *de novo* and carry it out on a different plan from that adopted by Mr. Ward. Instead of using an iron rod to draw the pipes across the bottom of the Narrows, the whole pipe will be connected and completed on ways on the north shore and a cable passed through it fastened to the rear end. The forward end will be kept afloat and it will be drawn across in this manner and then submerged. It will be tested by the Company's engineers up to a certain pressure both before it is moved and again after it has been laid in position. By the plan adopted there will be no strain on the pipes as there would be if they were pulled through the water from the forward end. The contractors agree to have the work done within two weeks.

Capilano Water Works

The contract for laying the water main across the narrows at Burrard Inlet, for the Capilano Water Works Co., has been awarded to Keefer & McGillivray, who have put up a guarantee of \$10,000 that the work will be completed in a specified time. The contractors are of opinion that they can do the job in two weeks. The pipes already put down have been taken up, and the work will be done over again.

The Vancouver Water Works.

A contract was let on Monday to Messrs. Keefer & McGillivray by the Vancouver Waterworks Company for the completion of the whole of the works to bring water from the Capilano River. The contract covers the whole of the work on the north side of the Inlet, the completion of the laying of the pipe across the Narrows and on the south side to a point where the distribution system commences. The whole of the contract is to be completed within three months from date. The contractors expect to have the work at the Narrows finished within two weeks.

The Waterworks

Mr. H. Keefer of the firm of Keefer and McGillivray, contractors for the work of laying the piping across the Narrows, telegraphed to-day to San Francisco for a quantity of 1 1/2 inch wire cable, which on its arrival will be used for stretching the pipes across. The plan of using an iron rod which was attempted by Mr. J. Ward, will not be continued. The pipes are being stretched along the shore and will be placed across all at the same time. We learn from Mr. Keefer that the work will be probably completed within the next two or three weeks. The men are busily engaged getting every thing in readiness.

1227
(1888)
Mr. Lewellyn, of Roberts & Lewellyn, marine engineers and divers, has succeeded in clearing the obstruction in the narrows which delayed Mr. Ward in the work of laying the pipes across that channel. Mr. Lewellyn was down for 40 minutes and during that time cut through the 1½ inch chain which had got jammed under a boulder, and made a connection with a cable. He reports the channel of the narrows from where Mr. Ward stopped in his work to the south shore as clear of any obstruction to the laying of the pipe. Messrs. Keefer & McGillivray, the contractors, are satisfied with Mr. Lewellyn's report and are pushing on the work preparatory to the laying of the whole of the pipe in one operation, as detailed in these columns a few days ago. Messrs. Roberts & Lewellyn have sent to Toronto for a complete new diving apparatus, including the appliances for using the electric light under water.

The Waterworks.

It was intended to-day by Mr. Jos. W. McFarland, Manager of the Vancouver Waterworks, to make the final arrangements for getting over the pipes from Victoria, which formed the cargo of the Camana to that city, and they will probably be delivered very shortly at Vancouver, so that, as soon as the work at the Narrows is completed, the work of laying the mains and off-shoots on the townsites can be commenced. The divers Messrs. Roberts and Lewellyn, have succeeded in surmounting the obstacles in the way, and as soon as the whole of the piping is ready prepared on shore and the 1½ inch wire cable for which Mr. H. Keefer telegraphed to San Francisco yesterday, arrives, the whole of the piping will be stretched across on the cable and submerged. The divers state that the channel at the point of crossing is now clear of obstructions.

VANCOUVER Water Works Company.

Tenders for Distributing Pipes.

SEALED tenders marked "Tender for Distributing Pipes," will be received by the undersigned until noon, Saturday July 21st, for the hauling and distribution of about 450 tons of cast iron water pipes from the wharf at foot of Abbott street to various streets throughout the city. Tenders to state price per ton distributed in line along the streets.

All information can be obtained on application at the office of the company, 118 Alexander street. Security will be required for the careful handling of the pipes.

The lowest or any tender not necessarily accepted.

J. W. McFARLAND,
Secretary V. W. W. Co.

The Waterworks.

This morning at about 10.30 the steamer Maude arrived at the city wharf from Victoria, with a large scow loaded with 180 tons of pipes for the Vancouver Waterworks Co. These pipes formed a portion of the cargo of the Camana which arrived at Victoria some time ago and has since loaded lumber and departed. It is not intended to lay these pipes, which are for use throughout the city, immediately, but we are lead to understand that the work of distributing them along the streets will be soon commenced, so that they can be laid without delay. Mr. Keefer, the contractor, states that everything at the Narrows is making good progress, and when the whole of the flexible-jointed piping is ready prepared on the shore, the actual submerging of the pipes will not take long.

The steamer Maude arrived yesterday from Victoria with a large scow loaded with 180 tons of cast iron pipe from England for use in the distribution service of the Vancouver Water Works Co. As will be seen by the advertisement in another column, tenders for distributing the pipes in a line along the streets will be received by the secretary of the company, Mr. J. W. McFarland, up till noon to-day.

Mr. J. W. McFarland, manager Waterworks Company, accompanied by Mr. McCaneron, C. E., went on a tour of inspection to the Narrows this morning. Everything is reported to be in a favorable condition and the work progressing satisfactorily.

W. H. Armstrong, the contractor, commenced unloading the cast-iron pipes from the scow lying at the city wharf this morning, and the work of distribution will shortly be commenced. Mr. Armstrong is also carrying out the work in connection with certain repairs to the City wharf.

Messrs. Berry & Co. have been awarded the contract for distributing the pipes for the Waterworks about the city. The work is now being carried out.

THE WATERWORKS.

After the unforeseen and unavoidable delays which have occurred in the progress of these works, the completion of which is a matter of such paramount importance to Vancouver, it is pleasing to note the excellent progress which has been made during the past two weeks, and which give promise that within the next six weeks the enterprise will be so far advanced that it will only be a question of a few days when the works will be in operation. The contractors, Messrs. Keefer & McGillivray, have already 75 lengths of pipe jointed out of a total number of 115 and they expect to have all ready for testing by Wednesday night. They have got up the rods that Mr. Ward had the trouble with and are ready to put the cable across and draw the pipes as soon as the testing is completed to the satisfaction of the company's engineer. They have already half a mile of the trench dug on the north side of the Narrows in which the steel pipe will be laid. Both ends of the tunnel are faced and the driving commenced. The Company has contracted with Mr. W. H. Armstrong for unloading the distributing pipes and with Messrs. H. A. Berry & Co. for distributing the same through the city and this work will be commenced at once. Altogether the progress made is most satisfactory.

The Vancouver Waterworks Co., are keeping well to the fore in the general progress of the work. Another consignment of cast-iron pipes, are expected to be brought from Victoria at any moment and will be distributed where needed as soon as they arrive. Already about one mile of the work from the Narrows to the dam is well under weigh, as also the tunnel which will be 280 feet in length. It will not be very long before we may expect to have the clear limpid water of the Capilano River flowing in our city.

The Water Works.

Although the pipe which is to bring the water from the other side of the Inlet has not yet been laid across the Narrows, the company is laying the pipes along the streets in the full confidence that this part of the work will be successfully accomplished. It is not however unattended with difficulties, if not a slight mixture of uncertainty. The crossing of the narrows with its strong tide, deep water, rocky, clean swept bottom is no common undertaking, and until the work is successfully accomplished will cause some misgivings in the public mind, if not in the minds of those more immediately connected with the work. The company appear to have no doubts about the success of the issue, judging by what it is doing on this side of the inlet, and its great confidence may be judged by its action. It is probably as well that this way of bringing water to the city should be thoroughly tested. The laying of the pipe is only the first part of the test; their adaptation and durability are also of importance. The time will come, and probably before, a great while, when the city will furnish its own water supply, and it will be of some advantage to have a question of this kind finally settled, and all doubts removed as to its practicability. In the meantime the success of the undertaking will be watched with much interest.

The test of the jointed pipes for the Waterworks system has just been made, and was followed by most satisfactory results. The process of submerging them is about to be carried out.

About 80 lengths of pipe out of a total of 115, have been jointed ready for submergence at the Narrows, and the general progress being made with the work is so good that the Contractors, Messrs. Keefer & McGillivray, are in every way satisfied. The cast-iron pipes which arrived from Victoria per steamer Maude a few days ago, have been all unloaded at the city wharf, and Messrs. Berry and Co. continued the work to-day of distributing them about the city.

THE WATER WORKS.

For some time past nothing has been mentioned about the progress of the water works and some persons have been inclined to think that the work was not being pushed with the rapidity that was expected. But while both the officers of the company and the contractors have not had much to say they have been quietly going ahead with the work at as rapid a rate as its thorough execution would permit.

All the flexible joint pipes that are to cross the Narrows have now been joined together and thoroughly tested by hydraulic pressure up to double the amount they will be called upon to stand when the works are in operation. They will be drawn across the Narrows at an early date, and yesterday Mr. J. W. McFarland, Secretary of the Vancouver Water Works Company, and Mr. H. E. Keefer, one of the contractors, went to Victoria to make the final arrangements for the operation.

The method of joining the pipes is a very interesting one. At one end of each pipe there is a cup shaped bell, and at the other a groove. The ends of two pipes are placed together and moulten lead is poured into the joint until it is filled up. The peculiar shape of the bell allows the end of the pipe with its leaden covering to move freely in its socket, thus practically making each pipe a link in a chain, allowing a play of about 30 degrees. This permits the pipes to easily follow the natural slope of the bottom of the Narrows, as well as allows them to move freely with the tide without bringing an undue strain on any part. Careful soundings of the bottom have been made by the company's engineer, Mr. H. B. Smith, C.E., the results of which show that the slope from the shores is a gradual one without any sudden dips and that there are no large boulders on the bottom.

Work on the tunnel about 3 miles from the shore through which the pipe line from the dam passes is being pushed as rapidly as the nature of the rock through which it passes will permit, some 30 feet of it being completed. Altogether the prospects of the completion of the water works system at an early date are of the brightest and within a short time Vancouver will have that priceless boom, an ample and practically unlimited supply of pure fresh water.

A large quantity of empty barrels have been delivered at the city wharf ready to be shipped to the Narrows. They will be used by Messrs. Keefer and McGillivray in their contract in floating the pipes ready for submersion. Mr. Keefer and some men left in the boat belonging to the firm this morning with supplies for the camp. The work of testing the pipes has been completed, and the first available opportunity will be made use of in carrying out the work of floating them across and submerging them. No difficulty is likely to be experienced. Mr. Smith, the engineer, reports the surface at the bottom at the point the pipes will be laid to be free from obstacles, with a gentle slope, so that once the pipes are laid they will rest secure from all harm. It is impossible to surmise as to the exact time this portion of the work will be carried out, but the first favorable opportunity next week will be taken advantage of.

The work at the Narrows has been during the last week making all the progress possible, but a favorable opportunity has not yet appeared for the actual laying of the pipes across. All the preparations for the work of submersion have, however, been made and everything tested, but it is not probable that the pipes will now be laid this week. The work will in all probability be deferred until the early part of next week. It is stated that nearly all of Messrs. Keefer's and McGillivray's "boys" intend to come over to-morrow in order to take in the circus.

Diver Llewellyn walked yesterday across the Narrows from shore to shore on the bottom, along the line that the water works pipes will be laid, and following the cable now stretched across. A small boat containing the air-pump and life-line was rowed across at the same time. The tide was at its lowest and the greatest depth he had to go was about 60 feet. The distance travelled was about 1800 feet and it took Llewellyn 30 minutes to accomplish it and examine the ground. He reports that the bottom is smooth and free from boulders of any size and that the descent on either side is gradual. This examination ought certainly to set at rest forever any doubts as to the practicability of drawing the pipes across.

The Daily Times.

PUBLISHED EVERY AFTERNOON EXCEPT SUNDAY.

Victoria, - Tuesday, Aug. 21, 1888

A DIFFICULT WORK.

It is said that on Thursday last an attempt was made to haul the pipe line of the Capilano water works across Burrard Inlet at the Narrows. The steel wire rope which was passed through the pipes snapped like a thread under the heavy pressure it was subjected to, and that without moving the pipes. A good deal of discussion on this undertaking is going on in this city, among men who understand and feel interested in that kind of work. One gentleman was heard to express the opinion the other day that the pipe could not be drawn across the Narrows and secured there. His way of laying it down would be this: In some little bay on the Inlet he would build a large float which would extend right across the Narrows. On this he would stretch a line of pipe and at slack water tow the float into position and drop the pipe overboard. The idea seems to be a good one, and may eventually have to be adopted. A great many on the other hand maintain that the scheme is not a feasible one. The opinions, however, of any number of Mr. PECKSNIFFS is unimportant now. What is wanted is a means of effectually laying the pipe across the Inlet and securing it there.

Mr. R. P. Rither, one of the directors of the Vancouver Water Works Company, is now in the city. It is expected that the work of laying the pipes from the Narrows up the canyon to the dam will be commenced within the next two weeks. The steamer Maude is expected to arrive either to-day or to-morrow with a second load of distribution pipes for use throughout the city. The first favorable tide will be taken advantage of to lay the pipes across the Narrows.

WATER SUPPLY.

Heretofore the city of Vancouver has been inadequately supplied with water. The location of the city on a peninsula, formed by English bay and Burrard's inlet, has completely shut out the town from the available supply of fresh water at all adapted to the wants of the people. The only water obtainable in Vancouver is that which falls on this narrow neck of land on which the city is located and seeps through the soil, or water caught during the rainy season. The necessity of obtaining a pure and abundant supply of water was early called to the attention of the promoters of Vancouver's prosperity, and steps were early taken to secure such a supply.

Just across the harbor from Vancouver is a high range of mountains, the highest peaks of which are the abodes of perennial snows. Here was an abundant supply of pure snow water which trickling down the mountain sides formed rivulets, which combining into larger streams came out of the gorges at the base as roaring mountain torrents. This water must forever remain uncontaminated. Flowing over rocky beds, it was not polluted by the seepings of the lowlands. Here was an unending supply of the purest water, but the serious obstacle to be overcome in bringing this water into Vancouver was to convey it across the briny waters of the inlet. This was long the stumbling block in the consummation of any schemes for making this supply available in Vancouver.

Early in 1887 two rival schemes for furnishing the city with water were presented to the common council of Vancouver. The board accepted one of these propositions, but the veto of the mayor negatived it. The rival scheme the Vancouver Water Work Company then proceeded to work, with no bonus being guaranteed, thus proving conclusively their confidence in the future of the city.

The first survey for the Vancouver Water Works Company was made in December, 1885. The company was incorporated April, 1886, with a capital stock of \$250,000. The place of supply from which this company is bringing the water to the city is at: Capilano river, six and a quarter miles east of the first narrows. At this point they have constructed a dam 300 feet long and fifteen feet above the bed of the river, forming a magnificent reservoir. From this dam the water is conveyed two and one-half miles by a 22-inch steel-riveted pipe, connecting with a 16-inch steel-riveted main, which will carry the water to the first narrows. The crossing of these narrows is effected by means of Ward's flexible cast iron pipe, two parallel rows, 12 inches in diameter and 1½ inches thick, being laid at the bottom of the inlet. A 16-inch steel-riveted main will connect on the south side of the narrows with this submarine main, carrying the water across Government reserve and along the center of Georgia street to Granville street, which will be the central point of distribution in the city. The city distribution system was devised by Thomas C. Keefer, C. E. C. M. G., the highest authority on water works in Canada and the United States. The completion of these works this summer insures a perfect fire and water service throughout the whole city. As a commencement the company will lay an 8½-inch main through the city and will put in as many hydrants as may be desired by the municipal government. The elevation of the reservoir on Capilano hill is 417½ feet above high-water mark of Burrard inlet. The average level of the city above high-water mark is 100 feet. The extreme height of the city is just south of False creek where an elevation of 200 feet is attained. The head of water in the city proper will be nearly 300 feet. The mains in the center of the city will be capable of discharging 3,500,000 gallons daily. The river from whence this supply is taken discharges at the lowest known water 440,000,000 gallons daily.

Number of water companies in the city, 1; capital stock water company, \$250,000; capacity water mains discharging in the city daily, 3,500,000 gallons; water discharge of river where water supply of city is taken from, at lowest known stage of water, daily, 440,000,000 gallons; elevation of reservoir, where water supply of city is taken from, above high water mark of Burrard's inlet, 417½ feet; average elevation of city above same level, 100 feet; extreme elevation of city above same level, 200 feet; "head" of water in city mains, average, 300 feet.

1. That the Council take into consideration the communication of the Vancouver Water Works Company, with a view to having hydrants placed in proper positions for the supply of water.

Ald. Alexander asked that the question of a water supply be taken into consideration and that the placing of the hydrants be determined at once if the company's proposition was going to be accepted.

The Mayor said that the company's proposition was to supply 75 hydrants at \$5 each per annum.

Ald. Humphries said that a special committee had been appointed and had seen fit not to accept the company's offer.

Ald. Alexander said the committee had no power to either accept or reject the offer.

Ald. Humphries asked if any other proposition had been submitted.

The Mayor said that the company wanted \$5000 for the city's water service, \$3750 for 75 hydrants at \$50 each, and \$1250 for flushing sewers, street sprinkling, etc.

Ald. Coldwell suggested that the whole matter be referred to the Fire, Water and Light Committee to report at the next meeting which was agreed to.

Alf. Humphries asked if the special committee already appointed on the subject had been discharged.

The Mayor said that the matter was now entirely in the hands of the Fire and Water and Light Committee.

The second attempt made to lay the water pipes across the Narrows at the Inlet has proved successful, and in a short time Vancouver will be supplied with copious supply of fresh, clear water. Naturally the citizens are jubilant, the conditions heretofore having been the worst imaginable. The Capilano water, whence the supply is brought, is cold and refreshing.

Campobello Granted a Divorce.

A private telegram from Vancouver informs us that the water pipes have been successfully laid across the Narrows. Some difficulty was at first experienced, but the work has at last been accomplished. A copious supply of pure water thus ensured to the city at an early day. We congratulate the company, which we believe is largely composed of Victoria men, upon the final success of their enterprise, for with the laying of this pipe all difficulties are surmounted.

The Pipes Successfully Drawn Across
the Narrows.

PROBABLY no news could be more interesting or more welcome to the people of Vancouver than that we have to communicate this morning—that the contractors for the Vancouver Water Works Company yesterday successfully completed the task of laying the pipe across the Narrows. For months past there has been a lively discussion carried on about this operation. Until the thing was actually accomplished those who saw all kinds of difficulties in the scheme of course had the best of the argument. We regret to say that there have not been wanting some amongst us who seemed to desire that the scheme might result in failure, if only for the reason that their gloomy prognostications might be proved correct. The pipe across the Narrows was the *crux* of the whole undertaking, and on it the failure or success of the enterprise depended. Although pipes have been laid for a similar purpose under other bodies of water, the operation had never before been made under precisely the same conditions. The swift current of the Narrows was looked upon as a great difficulty in the work of laying the pipe, and even many who sincerely hoped that the Company would succeed in carrying out the enterprise, felt great anxiety and doubt as to the possibility of the project. As our readers are aware, from the first inception of the scheme and from the day that the proposal to supply Vancouver with water from the Capilano River was laid before the citizens, we have maintained our confidence in the feasibility of the project and that it only required the proper mechanical appliances to accomplish the task. The delays which have occurred and which have been made so much of by the opponents of the scheme were not at all connected with its practicability, but arose from various reasons entirely distinct from that, such as the incompetency of the original contractor and similar causes.

With the successful accomplishment of this part of the scheme, the remainder of the work is easy and ordinary enough. The operations on the north side of the Inlet are progressing rapidly, nearly one-third of the tunnel in the canyon, which is the heaviest part of the work, being already completed, and the remainder will be driven as fast as continuous operations can accomplish it. The distribution pipes are already on the ground where they will be used, and the work of laying them will be all finished before the tunnel on the other side is completed. The Company can now calculate almost to a day the date when it can give the citizens an ample supply of the purest water from the melting snow upon the mountains. Not only to the Company, but to the city at large the successful achievement of yesterday is a notable event. A good water supply is the one thing necessary to make Vancouver complete in all matters which tend to make a city a healthy and pleasant place of abode and this is now within a few weeks' time of being obtained. As a security against accidents or any unforeseen contingency, the Company will within a short time lay two, and perhaps three, additional pipes across the Narrows and the experience gained in laying the initial pipe will make the repetition of the work a matter of little difficulty and no uncertainty.

The Water Works.

The most important and most difficult part of the undertaking in connection with a water supply for this city was accomplished yesterday. Laying pipes across the Narrows was undoubtedly a hazardous undertaking. Whatever the nature of the faith in its possibility there must have been in it an element of doubt. The men who have undertaken to supply the city with water manifested their faith by their works, but we fancy the most sanguine of them will breathe easier now that the twelve inch pipe has been safely disposed at the bottom of the Narrows. We hardly think that any person would be envious at the company having successfully accomplished this difficult part of their work. That is too much like measuring other people by ones self. There may have been doubts expressed about the success of the enterprise, but that was not very unnatural considering the nature of the work which had to be done. Without exception we think the people of the city will be pleased to hear, that the company has succeeded in the most difficult part of their work. To them it ought to be a matter for rejoicing, and of nearly as much importance as to the company. Good water is an indispensable necessity to health and an abundant supply to cleanliness. This is what the city is not blest with at the present time, and many citizens know that by experience. This water supply is now within a measurable space of time. The work on the north side of the Inlet is progressing rapidly and what has still to be done is being pushed forward as speedily as possible, on this side, and in the city the pipes are distributed along the streets and laying them will shortly be commenced. It is intended, we understand, to lay several other pipes across the Narrows in case of accident, so that the supply will not be cut off. This is a precautionary measure and one that ought to go along way in making a constant supply of water all but a certainty. The citizens can now look forward with certainty to having a supply of good water amply sufficient for all requirements.

The Submerged Pipe Tested.

Capt. Irving received a telegram from Vancouver yesterday afternoon announcing that the submerged pipe had been successfully tested, a pressure of over 300 pounds to the square inch was withstood, and there was every evidence that the pipe did not leak at any point. Mr. Thos. Earle said that the work of laying the distribution pipes would be pushed, and that he expected they would be able to supply Vancouver with pure water within sixty days' time.

In connection with the waterworks everything is proceeding without a hitch, and we may shortly expect to see a force of men busy laying the pipes throughout the city. Mr. Hammond, a diver from Victoria, is expected to make a final test of the submerged pipe at the Narrows, on behalf of the Waterworks Co., the examination of the pipes, under water which has already been made by Mr. Llewellyn the Vancouver diver, having been made on behalf of the contractors, Messrs. Keefer & McGillivray.

wees.

Yesterday the water pipes were successfully drawn across the Narrows. Three heavy wire cables were fastened to the pipes and four pile-drivers and one steam winch were employed in drawing them across. An hydraulic test of the pipes up to 300 pounds pressure to the square inch will at once be made. It is the intention of the company to lay three more lines of 8-inch pipes across the Narrows, so that in case of accident to any of the pipes the city shall not suffer for want of a supply of water. The total length of pipe drawn across yesterday was 1,104 feet of 12 in. diameter. Twelve more lengths of flexible joint pipe is to be added to the northern end. Much credit is due the contractors, Messrs. Keefer and McGillivray, and their staff for the manner in which they have carried out this work in the face of so many obstacles, doubts and opposition.

At a meeting of the Board of Trustees last evening the application of a Mr. Law, B. A., of the City of Three Rivers, Quebec, was accepted for the principalship of the public school.

The case of the Foundry and Iron Works vs. the Water Works Company was commenced to-day before Justice McCreight at the City Hall. Mr. Theodore Davie, Q. C., and Mr. Eberts, of Victoria, counsel for the Water Works Co.; Mr. J. J. Blake, City Solicitor, and Mr. Boulton, for the Foundry and Iron Works.

Capt. Harmon, the diver, employed by the Water Works Company to make a test of the submerged pipes on their behalf, has completed the work and furnishes even a more favorable report than did Mr. Llewellyn. The whole length of pipes from one end to the other have cut a groove in the rock bottom, with the exception of about three feet in one spot, and practically the whole of the long line is now covered over with a soft deposit of mud. The report is most satisfactory in every way. The Company is now about to advertise for applications for water, with a view to seeing to what extent it will be necessary to lay the pipes right away. The Company will make all connections from their mains as far as the street line, the cost of connecting which with the house coming out of the pocket of the party getting water put in. The rates will be very reasonable, thus enabling everybody to patronize the new water supply.

THE WATER WORKS.

The work on the water works is going on steadily and every day brings a supply of pure, fresh water nearer to Vancouver. On Thursday last a hydraulic test under the direction of Mr. George A. Keefer, C.E., was made of the pipes that were successfully drawn across the Narrows last Tuesday. The test was up to 300 lbs. pressure per square inch and was entirely successful the gauge slowly and regularly going up to the required standard. The testing apparatus was in charge of Mr. Whitworth, a most efficient engineer. The pipes stood the enormous pressure splendidly and as the test made before they were laid was from the other end, forcing each joint outwards, while this one had the effect of forcing them together, it is considered that the joints and pipes are in excellent shape.

Diver Llewellyn again walked across the Narrows the day after the pipes were drawn across and reported that they had cut a groove in the soft sandstone rock as they were being pulled over, and that already considerable silt was being deposited, so that in a short time it is likely that the pipes will be entirely covered. Llewellyn deserves a great deal of credit for the plucky way in which he makes the descents, as at times the tide is running very swiftly at the Narrows and the labor involved in struggling against it while doing the work required of him must be very great. He reports that at the bottom in the centre of the Narrows the current is less than at the sides and much less than is commonly supposed. The extreme depth at low tide is 58 feet.

The waterworks company have applied the test of 300 lbs pressure to the square inch to the submerged pipes at the Narrows and everything has been found to be entirely satisfactory, not a single flaw being found anywhere. The work of distributing the pipes throughout the city and putting in position the pipes to the dam will be carried on now with all possible expedition and the city may expect to have water turned on within the next two months.

PERFECTLY SATISFACTORY.

On Monday morning last Mr. Harman, the diver employed by the Vancouver Water Works Company, went down in the Narrows to examine the condition of the pipe across the Inlet, the laying of which by the contractors, Messrs. Keefer & McGillivray, was reported last week. Mr. Llewellyn, the diver employed by the firm mentioned, had already made an inspection for the contractors and found everything satisfactory as regards the manner in which the pipe had been laid. Mr. Harman descended on the south side of the Inlet and walked right across on the bottom, coming out on the north shore where the pipe from the canyon enters the water. He says that it is almost impossible to conceive of a more suitable location for the pipe than the one it occupies, or that the pipe could have been laid better had it have been on dry land instead of at a depth of 70 feet below high water mark, as it is at high tide. The bottom on the north side is a bed of shingles or large gravel, there being scarcely any boulders which would not come under that category. Towards the middle of the channel, where the current chiefly is, the bottom is almost smooth and consists of a description of soft sandstone such as is seen on the shore on the south side. As this shore is approached this sandstone is found covered with ooze and slime as may be noticed when the tide is out. In drawing the pipe across it made a passage for itself through the boulders which are now heaped on either side of it, the top of the pipe projecting but little above the gravelly bed. In passing over the sandstone the pipe has also to a considerable extent gouged out for itself a kind of gutter in which it lies securely enough. Only one length of pipe lies above the bed to any extent, and that is perhaps 18 inches in one part where it passes over two little eminences in the bed. Only two boulders or rocks of any magnitude were seen by Mr. Harman in the vicinity of the pipe and by a singular piece of good fortune it has happened that the pipe was drawn just between them, so that instead of its passing over them and being entirely exposed in the water, it is protected by them on either side, up and down stream, lying half buried in the shingle and soapstone. The cross section of the bottom of the bed of the Narrows, as described by Mr. Harman, is admirably adapted for the laying of a pipe, and with a gentle slope from either side without any abrupt declivity or steep channels, is all that could be desired for a work of this character, and completely bears out the examinations of the channel's bed made by Mr. H. B. Smith. Indeed on all matters connected with the Company's undertaking, the reports of its engineers have been amply verified by the results of later circumstances. While the report of Mr. Harman is, of course, very satisfactory to the Company, it is also very interesting to the people of Vancouver to know that its operations promise a speedy and successful termination resulting in furnishing the city with an abundant supply of the purest water.

THE INTERPLEADER SUITS RE THE WATER PIPES.

To the Editor of the NEWS-ADVERTISER:

SIR,—In to-day's issue of the NEWS-ADVERTISER I observe an article purporting to be an account of a case in the County Court yesterday, in which this Company is described as suing the Vancouver Water Works Co. on account of some work "done for J. F. Ward, the contractor who failed to lay the pipes across the Narrows and for which the Water Works Company disclaims any liability." Now, as this version of the affair is in our judgment likely to lead people ignorant of the facts to think that we, through some hostile action towards the Water Works Co., are putting obstacles in the way of the citizens of Vancouver obtaining what we all want so badly, pure water. I wish most respectfully to say that such is not the case and to request you to give the following simple statement of facts a place in your next issue.

First.—We do not claim that the Water Works Co. are liable for Mr. Ward's debts nor have we entered any suit against them on that or any other account whatever.

Second.—Mr. Ward was a stranger to us, but as we were informed came here on the invitation of the Water Works Co., at all events, they gave him the contract for furnishing and laying the pipes across the Narrows.

Third.—This action on the part of the Water Works Co. in entrusting to him such an important work was naturally looked on by the outside public, ourselves among the number, as if not a legal, at least a moral endorsement of his character as a thoroughly capable and honest man.

Fourth.—Acting on this impression we and others did work for and furnished him with materials for the prosecution of his contract.

Fifth.—He went away without paying us but left a considerable amount of property here behind him.

Sixth.—We and other creditors of Ward, among whom are the Hastings Mill Company, Thomas Dunn & Co., and F. Little, having duly obtained judgments and executions against him the sheriff seized this property on our account.

Seventh.—The case in the County Court yesterday was not one of the Foundry Company against the Water Works Company but one of the Water Works Company trying to upset the action of the sheriff and so keep possession of all of Ward's property themselves while we and other citizens of Vancouver would remain unpaid.

Eighth.—This property left by Ward has been valued by competent parties as sufficient not only to pay all his fair and legal debts here but also to more than reimburse the Water Works Company for any moneys they may have paid him on account of his contract.

I remain, dear sir, yours respectfully,

R. P. COOKE,
President.

Vancouver, Sept. 5.

From J. W. McFarland, secretary of the Water Works Company, stating that the agreement of the city with the company was to take 76 hydrants at \$50 each per annum, and also to pay \$1,250 per year for street sprinkling, public fountains and flushing the present system of sewers. Referred to the Fire, Water and Light Committee.

REPORTS.

FIRE, WATER AND LIGHT.

The report of the Fire, Water and Light Committee was read as follows:

The Fire, Water and Light Committee met on Thursday, August 30th, 1888, and beg to recommend:

(1) That the present system of electric lighting be tested, with a view of ascertaining whether we have the candle power bargained for.

(2) That the Vancouver Electric Illuminating Co. be asked to extend their contract for street lighting for two months after the expiration of present contract, on the same terms.

(3) That the Vancouver Water Works Co. be asked to put in writing the proposition made to the committee of the Council appointed to confer with them on the water works question, and that they be requested to kindly supply a number of maps showing the position of mains throughout the city.

The regular meeting of this committee has been changed to 3:30 p. m. instead of 4 o'clock.

J. HUMPHRIES,
Chairman.

3:30 o'clock. Regular hour of meeting of Fire Water and Light Committee: none of the members present except the Chairman; who begs to submit the following report for the acceptance of the Council:

1. That the Chairman has taken into consideration the location of hydrants, as suggested by the Council, and herewith submits a map of distribution, hoping the council will see fit to act in the matter so that the promoters of the water works can proceed with the work immediately.

2. That the present electric light for street lighting is a humbug and expensive, and would recommend that the Board be authorized to enter into a contract with some company that will furnish a more modern and economical system of electric light for street lighting.

J. HUMPHRIES,
Chairman.

The first report was adopted and the second laid over until next meeting, on motion of Ald. Brighouse, seconded by Ald. Oppenheimer.

Ald. Clark said that the water works company were anxious to proceed with their work and thought that the matter should be proceeded with at once.

Ald. Humphries said that owing to the want of a quorum of the Committee at last meeting the matter had not been decided, but he had marked out the hydrants as he considered would be the best. He hoped the Council would

adopt the plan at once, so that there should be no more delay.

Ald. Oppenheimer said that important business kept him away from the last meeting but he thought that the matter should be carefully gone into at their next meeting. The suggestion was agreed to.

Moved by Ald. Oppenheimer, seconded by Ald. Brighouse, that the Mayor and Chairman of the Finance Committee are hereby authorized to ascertain upon what terms they can negotiate a loan of \$250,000 on forty year debentures for the purpose of either purchasing or constructing water-works. Carried.

Moved by Ald. Brighouse, seconded by Ald. Oppenheimer, that the Board of Works are hereby empowered to have made the necessary preliminary surveys for a pipe line from Coquitlam River and Seymour Creek to Vancouver.

Ald. Clark thought this would be involving the city in needless expense and he would vote against it.

Ald. Oppenheimer said it would only cost a very little.

Ald. Clark said there was no telling what it would cost.

The resolution was then amended so as to read that the Board ascertain the cost of making such surveys and was then carried.

RECORD OF NEW WATER-WORKS CONSTRUCTION.

(Specialty Communicated.)

We have received from HENRY B. SMITH, M. Cam. Soc. C.E., of Vancouver, B. C., a very full and interesting description of the works now under construction by the Vancouver Water-Works Co., Limited, for the supply of Vancouver. These works were designed by G. A. KERR, M. Inst. C. E., London, England, and are being constructed with Mr. SMITH as Resident Engineer. Capt. J. McFARLAND is President and J. W. McFARLAND, Secretary of the Company, which has a capital stock of \$500,000. All the contracts have been let except those for street trenching and it is expected that the works will be in operation by Nov. 1, 1888. The contractors for clearing, close cutting and grubbing are Stevenson & McCraney, for laying mains to city, Keefer (H. F.) & McGillivray, Vancouver; for delivering pipes to the city, Berry & Co., Vancouver; for the cast and wrought-iron distribution pipes, Welch, Rithet & Co., Victoria, B. C.; for steel mains and for valves and hydrants, Albion Iron Works Co., Limited, Victoria, B. C.

The source of supply is the Capilano river, a mountain stream with rapid fall. An impounding reservoir is formed by a timber dam loaded with boulders at a point about ten miles from the city. From this point water is conveyed by gravity to Vancouver, a submerged main being laid across Burrard Inlet and Coal Harbor Bay. The distribution system will have about 9 1/2 miles of pipe and 76 hydrants. A more extended description of these works will be given in the Manual.

Engineering News Sept. 20th

Use small number of Aldermen present at the meeting of the City Council on Monday evening last evidently determined to show the citizens that though only a little band those who were there were literally bristling with schemes for spending the money of the taxpayers and benefitting in ways more or less direct themselves, their friends and trusty henchmen. Indeed it is scarcely credible that so many and such widely different schemes could have been brought forward, carried through different stages and in some cases put upon the statute book by so few men in such a short space of time. It is a most complete rebuke to those who associate the idea of slowness with the aldermanic character or imagine

that when a man becomes a member of a municipal council any brilliancy which he may have possessed is immediately deadened by contact with the new but sombre and prosaic associations. Vancouver in this, as in many other things, stands, perhaps, alone and her citizens, when they read the account of the proceedings of the Council on Monday night at their breakfast tables yesterday morning, must have felt like thanking a kind providence for such a Council.

Like a bee skipping from flower to flower these industrious Aldermen passed gaily and rapidly from one subject to another, and hospitals, fire limits, appointments of additional officials, sites for markets or great schemes of water works were touched upon in rapid succession, yet thoroughly and in most cases with satisfactory results to themselves. And like the little bee while enjoying the variety and beauty of the various topics, they did not fail to draw some nourishment for themselves from the different subjects they discussed. Napoleon once said "scratch a Russian and you will find the Tartar underneath." It may also, with a good deal of truth, be said of the ordinary Alderman, "scratch him and you will find Number One there." Whether it was a fire limit that was to be restricted, or a site for a market to be located, an investigation would show that an Alderman or an Alderman's relation had some lots conveniently near, while if a new system of water works is required their "uncles, cousins and aunts," happen to have an interest in just the scheme desired.

It is not improbable that the meeting of Monday last may be one that will not soon be forgotten and that will have important results for this city. Certain indications were then apparent of the prospect which lies before the city if her people do not rouse up and take some more active interest in municipal concerns. With their appetites whetted by what they have already done, some of our aldermanic friends are evidently preparing to make another attack to which their former efforts will seem but very feeble attempts. With some the aim is to carry through some scheme which shall leave good fat results in their own pockets. Others are ambitious of place or power, honorable if conferred by the unsolicited votes of their fellow-citizens, disgraceful if obtained as the result of jobs or trades with others eager also for similar assistance in an attempt to get other advantages at the expense of the people.

The possibilities opened up by the proceedings of last Monday night are too serious to be carelessly dismissed. Secure in their temporary power, some of the council evidently thought that no job was too flagrant, no proposition too outrageous to bring forward. We shall refer to these matters again, but meanwhile we may instance the proposal to have a survey made for a system of water works, entailing a large and uncertain expense upon the city, and which would have been approved but for the remonstrance of Alderman Clark, who protested against such a shameful expenditure of public money for private purposes. The only consolation left to the people who have voted their money and now see it being squandered, is that possibly the astonishing proceedings at this last meeting of the Council may be the cause of the citizens taking matters more into their own hands.

VANCOUVER WATER WORKS COMPANY. NOTICE.

The Company being about to lay the water pipes throughout the city, intending consumers will save time and expense by making application for service at once, so that the service connections can be made while mains are being laid. Any connections made after the main trenches are filled in, will have to bear the expense of re-opening. The applications, as far as practicable, will be treated in the order in which they are received.

Forms of application and schedule of rates will be furnished on application to the undersigned at the office of the Company, No. 118 Alexander Street, on and after Monday, 17th instant.

J. W. McFARLAND,
Secretary.

It is reported on good authority that Mr. J. F. Monteith has deserted his first love and is now engaged in taking the levels of the streets for a rival water works scheme.

The Vancouver Water Works Company has secured two lots on Hastings street, just east of Columbia avenue, on which it is the intention to erect at once the company's offices, etc.

The additional flexible joint pipes which are to be laid at the North end of the present pipe line have arrived from Victoria. The work of laying them will be proceeded with at once.

FRIDAY, SEPTEMBER 14, 1888.

Among the resolutions proposed in the meeting of the City Council on Monday last was one that the Board of Works should be empowered to have the necessary preliminary surveys made for a pipe line from the Coquitlam River and Seymour Creek to Vancouver. On account of the opposition of Alderman Clark to this expenditure, the resolution was so amended as to be merely an instruction to the Board of Works to ascertain the cost of such surveys and in this form it was carried. Provided no expense is entailed in ascertaining the desired details there is no reason why the Aldermen should not be allowed to add to their present stores of knowledge the information asked for. If, however, the acquiring of these facts involves an outlay, even though small, we think the Board of Works should report the matter back to the Council without action. The taxpayers of this city have, at least at present, not the slightest interest in obtaining the information referred to in the resolution. Much less have they any use for the proposed surveys of the two streams which certain members of the City Council are so keen to have made. Although the city has more than trebled its population since the great discussion on the proposed contract between the city and the Coquitlam Water Works Company took place in the spring of last year, and many new citizens would now be entitled to an expression of opinion on the subject, there is no reason to suppose that another appeal to the taxpayers for aid to that corporation would be any more successful than was that made in May, 1887. The reasons which led the electors to defeat the by-law giving the guarantee of the City to the bonds of the Company are even stronger now than they were a year or more ago. At that time the problem of an abundant supply of water for Vancouver was one which no one had taken any practical steps to solve. Two

companies had indeed been organized for that purpose. Both had made propositions to the city; both expressed their intention of carrying out their works whether they received any municipal aid or not. But there was a large number of people who doubted very much both the ability and the intention of either company to build water works unless it received substantial aid in the way of either a subsidy or guarantee from the city.

The present circumstances are very different now to what they were then. The Coquitlam Company, failing in its attempt to get aid from the City, practically abandoned any attempt to carry out the purpose for which it was organized. The Capilano Company has, however, made good its statement that it would in any event proceed with the enterprise for which it had obtained a charter; has expended a large sum of money in the construction of its works and expects to be able to supply the city with water in about two months. The past history of the Company cannot but cause most people to have confidence that its anticipations will be correct. We shall then have a satisfactory supply of water and one of the most important wants of the city will have been met without any outlay or liability on the part of the taxpayers. For the present, therefore, it appears to us there is no pressing need for any further consideration of the subject, nor any necessity for discussing a proposition to acquire the ownership of this system for the city, or failing that to construct independent works. The charter of the Capilano Company provides for the purchase of its works by the city within a specified time on certain conditions. No disadvantage will accrue to the city by no action being taken in the matter for the present.

It will doubtless be claimed by certain parties that the proposition to make these surveys has nothing to do with the Coquitlam Company or any desire on its part to conclude any arrangement with the City and that, therefore, it is unfair to that company, while it may also be prejudicial to the City's interests, to bring into the discussion any reference to it. But we take a different view of this matter. The surveys, we believe, are proposed entirely in the interest, remote as it may seem to the careless observer, of that corporation. While the hand may appear to be that of Esau, the voice is that of Jacob, which, disguise it ever so well, can never be forgotten by those who have once listened to its dulcet tones. The proposal to survey Seymour Creek as well, is simply the sugar with which the pill is coated. The Coquitlam Company claims the right to supply water from the river of that name. Its projectors naturally desire, even if they cannot carry out their scheme themselves, to sell any reputed rights they may possess to the city and in this way at least recoup themselves for the outlay incurred in attempting to foist their scheme upon the people last year. But the taxpayers can see no advantage in assisting them in their sagacious idea and it is to be feared that they will have to bear the loss themselves. If, however, the City will have, as the parties interested in the Coquitlam Company insist, to ultimately obtain water from that river, would it not be well and greatly to the advantage of that Company for it to make the surveys, which Alderman Oppenheimer says would cost "very little?"

Vancouver Water Works Co.

MONTHLY WATER RATES.

Dwelling Houses, up to four persons,....	\$1 00
“ each additional person	0 30
(Additional Rates for Baths, Water Closets, Urinals and Hose.)	
Bakeries,	\$1 50 to 4 00
Bath Tubs, (private)	0 50
“ (public)	1 00
Barber Shop, 1st Chair,	1 50
“ each additional Chair,	0 25
Blacksmith Shop, 1st Fire,	1 00
“ each additional Fire,	0 25
Butcher Shop,	\$1 50 to 3 00
Building Purposes, each 1,000 Brick,	0 12½
“ “ Barrel Lime,	0 12½
“ “ “ Cement,	0 12½
“ “ Perch Stone,	0 10
Hotels and Boarding Houses, per Room,	0 20
Laundries,	\$3 00 to 20 00
Offices or Sleeping Rooms,	1 00
Printing Offices (not including Steam Engine)	\$2 00 to 5 00
Photograph Galleries,	1 50 to 3 00
Saloons,	1 50 to 3 00
Stables, private, for one Horse or Cow, including washing One Vehicle,	0 50
“ “ for each additional Horse or Cow,	0 25
“ Livery and Public, including Washing of Carriages, up to 6 Horses, each horse,	0 40
“ each additional Horse over 6,	0 25
Stores,	\$1 00 to 3 00
Urinals, each,	0 25
Water Closets, in public houses, each Bowl,	0 50
“ in private houses, “	0 25
Work Shops, not over 5 persons,	1 00
“ each additional person,....	0 10
Sprinkling with Garden Hose (Standard Lot, 25 x 122)	
“ “ 1 Lot,	
“ “ 2 “	
“ “ 3 “	
“ “ 4 “	

Water furnished for any purpose not embraced in the above will be supplied at special rates.

The Company reserving the right, at their pleasure, to substitute in lieu of the above special rates the rate of 60 cents. per 1,000 gallons.

Position of tap on Street, feet from line
of Street.

We showed yesterday the absolute waste of the city's funds that it would be to expend any money in making surveys for a pipe line from the Coquitlam or Seymour Rivers as was proposed to be done at the last meeting of the City Council. Connected with the same idea that the city must at once either purchase or construct a system of water works, was the resolution which was passed instructing the Mayor and Chairman of the Finance Committee to ascertain on what terms a loan of \$250,000 to run for forty years could be negotiated. It is to be hoped the two officials referred to will realise the unnecessary character of the labor they are asked to perform and do nothing more than make a formal report to the Council. There is nothing which requires such a large addition to the present debt of the City; it is quite certain that to add this amount to our liabilities would be most prejudicial to the city's interests and a most unjustifiable increase of the burdens laid upon the taxpayers.

No one will deny that the present credit of the City is excellent; that the price obtained for the debentures issued a few months ago was far better than even the shrewdest financiers two years ago could have anticipated would be obtainable for them. But there appears now to be springing up a desire amongst a certain section, both in the council and outside, to change the policy which has hitherto prevailed and which has brought about such satisfactory results. The present sound financial condition of the City seems to cause them to think that nothing that can be done can affect it, and that the money can be obtained for any scheme that may be proposed. The sooner these ideas are dissipated the better. There can be no doubt that for some time to come the City cannot afford to add to its present liabilities any considerable amount or to undertake any new works involving a large expenditure. Nothing is more sensitive than capital and a very little imprudence or the presuming too much on our present good credit would speedily bring about a great change in the manner in which our securities are regarded by financiers and capitalists. For the next year or so the expenditure for all matters, whether they be ordinary charges or extraordinary outlays, must be kept tolerably close to the amount of our ordinary revenue if the present satisfactory financial condition of the municipality is to be preserved.

Besides the direct necessity of such a course from the financial point of view, as regards the City's treasury, the importance of it in regard to other matters is scarcely less. Increased debt means greater annual charges and of course these bring in their train the necessity of imposing heavier taxation. At present our rate of taxation compares very favorably with any city on the coast and perhaps throughout the Dominion. If we are to attract capital here, if industrial establishments are to be located here and employment found for thousands of men, as we hope will be the case, moderate rates of taxation are not merely desirable, they are a necessity. Everyone is aware that in some respects we are handicapped heavily here in manufacturing enterprises in competition with eastern places. Let us therefore be careful not to impose unnecessary burdens on our people which are likely to retard our growth in population and commerce and greatly injure our permanent prosperity.

A quantity of rivetted steel pipes for the water works also hydrants and connections arrived from Victoria yesterday. Everything betokens the rapid approach of the day when Capilano's pellucid stream will be brought to the door of every citizen of Vancouver.

In regard to our remarks yesterday on the proposition that the City Council should have preliminary surveys made for pipe lines to the city from Coquitlam and Seymour rivers, we understand that the advocates of the measure are urging that although the surveys may be made it does not necessarily follow that the works should be constructed for some years. Nothing could be said that would more conclusively show the correctness of the position we have taken on the question. If anyone has a lot in Vancouver on which he thinks it possible that a few years hence he may desire to erect a house, he would scarcely think it necessary to go at once to an architect to prepare a plan and give him estimates of the cost. In the first place, he would consider it foolish to expend the sum for the architect's fee years before the work that the latter would do would be of any use to him. But a more important consideration still would be that an estimate prepared now would probably be almost valueless at the time when he would actually begin building operations. The architect in preparing his estimate would of course base it on the existing prices of lumber, brick and other material and the current rates of wages. It is, however, unlikely that in a few years from now there will not be many and important variations from the present quotations, and consequently any calculations now made would, as we have said, be of no value at a future time.

The supporters of the proposition before the Council appear to have entirely overlooked this circumstance, and in their anxiety to bring forward arguments to silence opposition to their action they have unwittingly supplied the strongest proof of the uselessness of the scheme they suggest. The more the proposal is considered the stronger, we feel sure, will be the opposition to any expenditure of the City's funds for such a purpose. It is scarcely possible that any of the materials that would be required for the construction of a waterworks system and the cost of the labor employed on the same will not be much lower in price four or five years hence, while it is equally certain that, provided the City's finances are judiciously managed in the interim, we shall be able to borrow money for the cost of the works on much less onerous rates than we could to-day. Furthermore, the City cannot enter into any scheme to build works of its own until its efforts to obtain any works already constructed have been rendered futile. No reasonable ground, therefore, can be given for the proposed expenditure, and if the Council orders the survey to be made it will be guilty of a deliberate waste of the City's funds. Besides there is still a company in existence which claims the right to bring water from one of the sources mentioned, and the City, therefore, cannot, even if it wished, obtain a supply from that place. Why, then, this anxiety to have the line from the Coquitlam River surveyed?

Communication received from John Irving, President of the Vancouver Water Works Company, drawing the attention of the Council that the Company will soon be in a position to supply New Westminster with an efficient water and fire service and asking if they were willing to enter into a contract, and supply the hydrants and grant the privilege of laying water pipes on the streets and so forth. On motion of Ald. Shiles, seconded by Ald. Herring, the clerk was instructed to notify Mr. Irving that the Council was not in a position to make any arrangement regarding the service.

FIRE, WATER AND LIGHT.

The report of the Fire, Water and Light Committee was read as follows:

A communication has been received from the Vancouver Water Works Co., offering to supply 75 hydrants and give sufficient water for public fountains, sprinkling of streets and flushing the present system of sewerage, for \$5,000 per year, payable monthly. We recommend that their offer be accepted and the hydrants located as follows:—1, on the corner of Georgia and Nicola; 2, Georgia and Jervis; 3, Georgia and Thurlow; 4, Georgia and Hornby; 5, Georgia and Granville; 6, Georgia and Richards; 7, Georgia and Cambie; 8, Dunsmuir and Burrard; 9, Dunsmuir and Howe; 10, Dunsmuir and Seymour; 11, Dunsmuir and Homer; 12, Dunsmuir and Cambie; 13, Pender and Thurlow; 14, Pender and Hornby; 15, Pender and Granville; 16, Pender and Richards; 17, Pender and Hamilton; 18, Pender and Beatty; 19, Hastings and Burrard; 20, Hastings and Howe; 21, Hastings and Seymour; 22, Hastings and Homer; 23, Hastings and Cambie; 24, Hastings and Abbott; 25, Hastings and Carrall; 26, Hastings and Westminster; 27, Hastings and Dunlevy; 28, Hastings and Carl; 29, Cordova and Granville; 30, Cordova and Richards; 31, Cordova and Cambie; 32, Cordova and Abbott; 33, Cordova and Carrall; 34, Oppenheimer and Columbia; 35, Oppenheimer and Gore; 36, Oppenheimer and Jackson; 37, Oppenheimer and Heatley; 38, Water and Cambie; 39, Water and Abbott; 40, Water and Carrall; 41, Powell and Columbia; 42, Powell and Westminster; 43, Powell and Dunlevy; 44, Powell and Carl; 45, Powell and Hawkes; 46, Alexander and lane in block 8; 47, Alexander and Gore; 48, Alexander and Jackson; 49, Alexander and Hastings; 50, Dunlevy, north of railway; 51, Carrall, near R.C.P. mill; 52, Dupont and Carrall; 53, Dupont and Columbia Avenue; 54, Dupont and Gore; 55, Dupont and Jackson; 56, Westminster and Keefer; 57, Westminster and Barnard; 58, Westminster, centre of block 24; 59, Westminster, at bridge; 60, Granville and Smithie; 61, Granville and Helmcken; 62, Granville and Drake; 63, Drake and Richards; 64, Drake and Hornby; 65, Davie and Seymour; 66, Hornby and Helmcken; 67, Hornby and Smith; 68, Howe and Davie; 69, Howe Nelson; 70, Howe and Robson; 71, Bute and Melville; 72, Bute and Seaton; 73, Burrard and Nelson; 74, Burrard and Robson; 75, C. P. R. wharf.

J. HUMPHRIES,
Chairman.

Ald. Clark suggested that more hydrant should be placed between Carrall and Cambie streets as the buildings were so close together in this part of the city. Plans showing the proposed location of the hydrants were produced and examined by the Aldermen.

Ald. Lefevre said that the latter portion of the report should be left over for a while. The city was going to be bound to pay \$5000 annually to the Water Works Company, he thought that the Fire, Water & Light Committee ought to try and make better terms. It would be well also as the city would probably purchase the water works to have an expert examine and report on the system. Another thing was that there was no provision for free water for manufacturers. This was sometimes given by way of bonus by eastern towns and cities and it would be well to have an agreement with the company on that point. Then, again as to the purchase of the works by the city, should the expert's report prove unfavorable, some other scheme should be tried. He also complained of the delay in getting in the water. They had promised that it should be in by July 1st and had constantly been put off from time to time. The expert could report as to when the water would be in. For these reasons he thought it better to allow the last clause of the report to go over for a week.

Ald. Alexander said that Ald. Lefevre was inconsistent in his remarks at one time he blamed the company for not getting the water in and the next moment wanted an examination by an expert before the city decided to take the water, thus further delaying the matter. The question of the City owning the water works didn't enter into the matter under discussion at all. The gist of Ald. Lefevre's remarks was to delay the matter until they could see if another scheme could not be got. The citizens would not stand any more delay. As to the question of free water to manufacturers that was outside the matter altogether but as for the question of bringing in water for fire purposes the sooner it was settled the better.

Ald. Lefevre moved, seconded by Ald. Brighouse, that the clause relating to the placing of hydrants be left over for a week and the rest of the report be adopted. Carried.

OUR WATER WORKS.

A Magnificent System, and one Worth of this City—An Accurate Statement of Facts.

The Vancouver Waterworks Company, who undertook the great scheme of supplying Vancouver with water from the Capilano River, without any bonus being guaranteed, made their first survey in December, 1885. In April, 1886, the company was incorporated with a capital stock of \$250,000. At the end of August most of the work of clearing, grading and close cutting, for which Stevenson & McCraney were the contractors, was completed. The dam was constructed during the spring of this year. It is 385 feet in length, and 31 feet wide. The top of the ridge of the tumbling way is 12½ feet above the bed of the river, and the elevation of the water flowing over the crest is 317 feet above the ground level at Hotel Vancouver. A caretaker's residence will be built close to the dam without delay. From this fine reservoir the water will be carried to what is known as the "tunnel," a distance of about 2½ miles, in 22-inch steel rivetted pipes, which in turn will connect with 16-inch steel mains, the latter extending as far as the Narrows, a total distance of about 6 miles. The total length of the tunnel, inclusive of 50 feet approaches on each side, is 380 feet. It may be mentioned that the 16-inch pipes referred to above are being on the increased fall, capable of carrying the same amount of water as the 22-inch pipes with which they connect, and which have only a slight fall. The work of laying the pipes is now proceeding. At the Narrows the 16-inch pipes connect with one row of 12-inch cast iron flexible jointed pipes. It is intended to put down another row of these submerged pipes at an early date. Inasmuch as the laying of these flexible jointed pipes was a work of considerable time, labor and expense, a short reference will not be out of place. The work of laying the pipes was successfully accomplished during the afternoon and evening of the 28th of August last, in the presence and under the supervision of Mr. G. A. Keefer, P. E., chief engineer to the company; Mr. H. B. Smith, engineer in charge, and Mr. Joseph M. McFarland, who acts in the capacity of secretary and manager for the company. Messrs. Keefer & McGillivray were the contractors who carried this important piece of work to a successful issue. Messrs. McCammon and Monteith, assistant engineers, were also present. In order to accomplish the desired end, a number of pile drivers were ranged in a row across the Narrows, the engines which furnished the power being on either side of the Narrows, stationed on piledrivers, whilst floats were used in supporting the length of pipes sufficiently to take a good deal of strain from off the wire cables, three of which were stretched and fastened securely to the pipes. Rocks, pulleys, ropes and all parts of the tackle were well tested. The ends of the long line of pipes were blocked so that there was no possibility of any water penetrating, the pipes having been tested with a 250 pound pressure some days before, with perfectly satisfactory results. When all was in readiness, the engines commenced to work, and as the ropes and cables stretched, the long length of pipes gradually moved down the skidways and slid along into the water without the slightest hitch or trouble. No hindrance or obstacle came in the way. The sun was just setting as the work was accomplished. When all the vast amount of labor, time and expense, and engineering skill necessary in contending with tides and other difficulties are taken into consideration the feat of laying these pipes across the Narrows, will rank as high as any achievement of an engineering nature yet accomplished on the mainland. The total length of pipes laid under water was 1016 feet. During the following days the pipes were subjected to a test of 300 pounds water pressure to the square inch, and to a test of 300 lbs. per square inch. Diver Llewellyn, on behalf of the contractors, and diver Captain Harman on behalf of the Water Works Company, both made a thorough test under water, walking along and examining the entire length. The divers found that the pipes had cut a groove in the soft sandstone rock at the bottom and were becoming covered with a soft loamy covering. All these facts proved satisfactory in every way. Since the end of August the company have been busy making preparations for the work of distributing and laying the cast iron pipes throughout the city. A 16-inch main connects at the south side of the Narrows and crosses Coal Harbor, connecting at the foot of Georgia Street with the main city artery, which will run along Georgia to Granville Street, from thence to Hastings Street, and along that street as far as Westminster Avenue, and from which the sub-mains will branch off at convenient places. The pipes used for the sub-mains are 8 inch, 6 inch and 4 inch in diameter respectively, according to requirements.

There will also be in addition, two miles of wrought iron 2-inch pipes for furnishing a temporary supply of water to thinly populated streets. On an average from about 40 to 50 men have been employed daily. Mr. Nickson, of wide experience, has charge of the work of laying the pipes throughout the city, and already about 8000 feet have been laid. The general work was somewhat delayed during the spring, owing to the fact that Mr. J. F. Ward, of Jersey City, N. J., who then had the contract of laying the flexible-jointed pipes across the Narrows, failed to carry out his contract, and several difficulties cropped up in consequence, which, however, were entirely overcome, and the contract awarded to the successful contractors Messrs T. C. Keefer and McGillivray. So far the barges Camana and Jan Baas have brought about 450 tons of 6-inch and 8-inch cast iron pipes from England and about 100 tons are expected by the barge Viola at any time. The Company are erecting temporary workshops on east Hastings street, and intend before very long building handsome brick offices, the location and probable cost of which, however, are not yet decided upon. The cost of the whole waterworks system on completion will just about reach \$250,000. THE WORLD desires to express its thanks to Mr. H. B. Smith, C. E., and other officials of the company for their courtesy in furnishing information. The directors of the company are as follows—Capt. John Irving, President; Mr. R. P. Rithet; the Hon. J. W. Trutch C. M. G., Mr. Thomas Earle, and Mr. D. M. Eberts, who also acts in the capacity of Solicitor to the Company. The knowledge that Vancouver will, in the course of a few weeks, have an abundant supply of pure water from a clear mountain stream, is merely the partial realization of an anticipated pleasure it has long looked forward to. The present distribution system will embrace about 11½ miles, and will be increased as occasion requires. The City Corporation has agreed to place 60 hydrants on the line of pipes as now located, and to add 15 more as the system is extended. The Company will do all the work to the edge of the street line at their own expense, whilst the householder will pay for the expense of making connections from the edge of the street to his house. The mains in the centre of the city will have a capacity for discharging 3,500,000 gallons of water in every 24 hours. There can be no doubt but that Vancouver will have every reason to be proud of its waterworks system.

(Ald. Humphries) could inform the Council that an eastern firm would put in a 200-horse power engine and furnish the city with lights at a cost of ten cents per candle power per annum, for which they were now paying \$1.66%. He said lights were a necessity, but he would like to see the Electric Light Company reduce their rates.

The Clerk then read letters that were forwarded by Ald. Coldwell relative to the remarks made by Ald. Humphries.

Ald. Lefevre considered it a mistake to enter into a contract with the Water Works Company and pay so much per hydrant when there was no prospect of the water being brought into the city for six months. In his opinion the City Engineer or some one else should be appointed to look into the matter. If they were certain when the water would be brought into the city it would be something to work upon.

Ald. Clark coincided with the last speaker, and said it would help the company greatly if the Council would designate the places where the hydrants were to be placed.

Ald. Lefevre moved in amendment that the City Engineer be instructed to inspect the work being done by the Water Works Company and report when, in his opinion, they would have water into the city.

Ald. Humphries said in his opinion it was necessary for the Council to know when the water would be turned on. He seconded the amendment.

Ald. Humphries considered it was necessary for the city to own the water works, the electric lighting and even the street railway and the sooner they did so the better it would be for the city.

The amendment being put to vote was tied on the following division: Ayes—Ald. Lefevre, Humphries, Oppenheimer, 3. Noes—Ald. Alexander, Clark and Dougall, 3. His Worship cast his vote in favor of the amendment. The report was then adopted as amended.

yet.

From Mr. H. B. Smith, resident engineer, transmitting a sketch plan of Vancouver Waterworks Company's system of distribution of water pipes.

FIRE, WATER AND LIGHT.

The report of the Fire, Water and Light Committee was read as follows:

The Fire, Water and Light Committee met on Thursday, September 20th at 3.30 p.m.; present Ald. Humphries in the chair and Ald. Brighthouse, Alexander and Oppenheimer.

The minutes of last meeting were read and adopted.

Your committee would recommend that the Council agree with the Vancouver Water Works Co. to take sixty hydrants, to be placed in the positions marked on accompanying map, marked in blue, and that the additional fifteen offered be taken when the company's mains are extended to other parts of the city, and that the city pay for said sixty hydrants at the rate of \$50 per annum for each hydrant.

And your committee would further recommend that all water needed by the city for purposes other than fire service be paid for by the city at the schedule rates of the company or by a lump sum of \$600 per annum.

And it is also recommended that a contract be entered into by the city with the Vancouver Electric Illuminating Co. for street lighting for the ensuing year, at the rates offered by said company, and that the lights to be furnished under said contract be divided as follows:—

Fifteen	40	candle power lights.
Forty-five	32	" " "
Fifty	20	" " "

J. HUMPHRIES,
Chairman.

Ald. Humphries said according to the offer of the president of the Electric Light Company lights of 3000 candle power would cost the city over \$5000. Proportionally the lighting of the city of Victoria would cost over \$200,000 annually (laughter). He had requested Ald. Coldwell while east to see about the price of lighting the city by electricity, and he

—Trenches for the water works pipes have been dug all along Cambie street from Pender to Water, and the pipes will be put together without delay.

The work of laying the water mains throughout the city is progressing rapidly. Already over two miles have been completed and as much more will be done as possible before the wet weather sets in. Much difficulty will be encountered when the fire hydrants are put in position as the mains will have to be tapped, whereas if the Council had designated the places where they wished them placed it would have saved the Company a great deal of extra labor and the city a large expense.

THE WATER WORKS.

Prices To Be Charged—Rules and Regulations to Be Enforced.

Now that every day brings us nearer the time when we shall be actually supplied with the very best of sparkling water from the rippling headwaters of the Capilano, it may be of interest to our citizens to learn briefly the regulations and rates under which the water will be supplied. First of all it may be stated that in all cases of non-payment of water rent at the office of the Company, within three days after the presentation of the bill, the supply will be cut off, and under any circumstances, the water will not again be turned on, until the amount due is paid, plus the sum of \$2.00 as a fine. A second rule states that no person or family supplied will be permitted to use the water for any other purpose than that stated in the agreement, nor to supply water to any other persons or families. Thirdly, consumers will have to prevent all unnecessary waste of water, and will not be permitted to make any concealment of the purpose for which it is used. No alterations will be permitted to be made to any water pipe or fixture, without due notice of the intended alteration being given. Another regulation requires that in all cases where water is to be supplied to several parties or tenants from one connection or tap, the Company is considered to contract with only one of said several parties, and on his default to abide by these regulations and pay the rates the water supply will be cut off. Whenever the regulations are violated in any way the water supply will be cut off, and not resumed until all charges are paid. Another important regulation necessitates that all persons taking water shall keep the service pipes in good repair at their own expense, and they will be held liable for all damage which may result from a failure to do so. Street sprinkling with private hose will in no case be permitted. It is also expected that the authorized Inspector or officials of the Company will be admitted at all reasonable hours to all parts of any premises supplied, so as to see that the regulations are observed. Proper applications for water have to be made to the company. The rates for dwellings containing up to 4 persons, for domestic uses only, will be \$1.00 per month. Where bath-tubs are used an extra charge of 50c per month will be made. For each additional person in excess of 4 a charge of 30c extra will be made. For horses and cows 50c extra, and for urinals, water closets, etc., 25c extra. The company also reserve the right at any time to substitute in lieu of the special rates, the rate of 60c per 1000 gallons measurement supplied. For laundries the rates are from \$3 to \$20, according to use. For stores, bakeries, hotels, printing offices, etc., the rates vary from \$1 to \$20 per month. These rates and regulations have been adopted by the Board of Directors of the Company, although special rates will be made in certain instances.

—A representative of THE WORLD learns from Mr. Jos. W. McFarland, manager of the Waterworks Company, that the barque Viola is daily expected to arrive from England with a large quantity of 4-inch pipes, which will be brought here as soon as they arrive at Victoria by the steamer Maud. The Albion Iron Works are busy day and night rivetting the steel mains, and the work generally is being pushed on by that vast concern with great vigor.

The steamer Maud arrived yesterday morning from Victoria with a mile and a half of water mains on board for the Vancouver Water Works Company for the pipe line between the north shore of the Inlet and the dam. The Albion Iron Works are now turning out these pipes at the rate of from 600 to 700 feet per day.

CITY COUNCIL.

The adjourned meeting of the City Council met last evening at 7:45 o'clock in the City Hall. There were present, His Worship Mayor Oppenheimer in the chair and present Aldermen Alexander, Humphries, Oppenheimer, Brighthouse, McConnell, Couth, Clark and Lefevre. The minutes of the previous meeting were read and on motion adopted.

COMMUNICATIONS.

From J. W. McFarland, secretary of the Vancouver Water Works Company, stating that he was in receipt of a letter relating to the location of the city hydrants, and would submit the same to the directors of the company at their next meeting.

From J. W. McFarland of the Vancouver Water Works Company, reporting that at a meeting of the directors of the Water Works Co., on the 8th inst. The following resolution was passed. "Moved by Mr. Rethet seconded by Mr. Earle, that the proposition of the City Council of 4th October be accepted, the company agreeing to supply water for all purposes other than for fire purposes at schedule rates. The contract to be for one year from the signing of the contract." He requested that the City Solicitor be instructed to prepare an agreement.

From Dr. A. M. Robertson submitting a report of the City Hospital and recommending (1) that visitors be admitted only on Wednesdays and Sundays between the hours of 3 and 4 o'clock, excepting by special permission; (2) that no

Ald. Alexander moved, that the City Solicitor be instructed to prepare the agreement with the Vancouver Water Works Company. Carried.

VANCOUVER WATERWORKS.

In the language of official routine, the Vancouver Waterworks Co., begs to report progress. Hydrants have been planted at the corner of Hastings street and Westminster avenue, and at the corner of Abbott and Water streets, and the company is now waiting for the four-inch pipe to arrive from Victoria to place the remaining ones. There is a reasonable hope, no accidents or other unforeseen causes of delay occurring, that the water works will be in operation by Christmas. The long tunnel, 290 feet in length in the canyon, is all done but 24 feet, and as 4 feet a day is being performed, the end of that will be in a few days. The short tunnel, 160 feet long, which cuts off a circuit of 1,600 feet is completed, as is also the excavation through the government reserve. The only cause of delay now is getting the mains, and these are being turned out at Victoria with all possible dispatch.

Our Water Works.

The Vancouver Waterworks Company are making good progress with the work of establishing the hydrants at their respective positions on the appointed streets. The corner of Carrall and Water Streets is now graced with a hydrant, and so are also the corners of Abbott and Water Streets and Hastings and Westminster Avenue. The work of placing them at the corners of all streets arranged for by the City Council will be carried on with vigor, the only cause of delay so far, it is learned from the secretary, J. W. McFarland, being the non-arrival of the 4-inch pipes from Victoria, but which are expected to put in their appearance at any moment. The suggestions thrown out from time to time by would-be rivals of the Company, that the city cannot expect to be in receipt of water until about next spring or summer, are likely to prove entirely worthless, for there is every prospect of the main streets being supplied with aqueduct by the close of the year at the latest. In reality the Company are doing exceedingly well.

A Painful Accident.

The late steward of the Parthia, Mr. Schmid, has sustained a painful fracture of his right leg and a dislocation of the left foot, and is in consequence laid up and in the doctor's hands. It seems that in the darkness which prevails, on most evenings, on Water Street, he stumbled and fell down where the excavations are being made for water pipes on that street with the above unhappy results. He was carried to Messrs. Lundberg & Becar's fish market and attended by Drs. Robertson and Bell-Irving and is doing well. He is 52 years of age.

THE WATER WORKS.

Yesterday the tunnel of 282 feet in length on the pipe line between the north shore of the Inlet and the dam on the Capilano River was completed and the workings run from either end were found to meet as exactly as could be desired. The only thing now that delays the completion of the whole system is the want of pipes for the mains up the canyon. Were there a sufficiency of these the whole work could be completed and water be supplied to the residents of Vancouver within three weeks. However, the steamer Maud is expected this morning with pipes sufficient to lay 2 miles, and at the rate the works in Victoria are turning them out now, it is expected that the whole quantity required will be here before the close of this month. There seems no reason to doubt that Vancouverites will be able to wash down their Christmas dinner with copious draughts of bright, pure and sparkling Capilano water.

At the Albion Iron Works--Activity at the Works.

Mr. Bullen showed us round the hydraulic shop where the water pipes for Vancouver are being turned out. The steel plate is first subjected to the hydraulic punch, when 55 rivet holes are punched at once. The plate is then rolled and rounded into shape; another

hydraulic press riveter, having a pressure of 40 tons, drives, heads and rounds the rivets on both sides alike. The single lengths are then riveted together in lengths of 35 feet; then subjected to a dipping process in a vat of liquid, asphalt composition, receiving its coating both inside and out, and is then pronounced the most desirable, strongest and best corrosive resisting water pipe in use. The Vancouver contract is nearly filled.

The water pipes have been completed through the 282 feet of tunnel between the north shore of the Inlet and the dam. Considerable delay is frequently being occasioned by the scarcity of pipes, but the Maud arrived from Victoria with a quantity sufficient to lay two miles.

The Water Works.

A representative of THE WORLD made a few enquiries relative to the progress of the work of laying the waterworks pipes both in this and on the other side of the Narrows, and learned that about 1½ miles were already laid from the Narrows to the rock tunnel, and between 5 and 6 miles throughout the city. All the 16-inch pipes delivered recently have been laid and the Albion Iron Works are now very busy turning out the 22-inch steel rivetted pipes to be laid from the tunnel to the dam. The company's engineer, H. B. Smith, states that the present dry clear kind of weather is most favorable, as there is less difficulty in contending with water in the trenches. The frost only penetrates a few inches in the ground and does not affect the work of digging to any extent. The system has been so arranged throughout the city that, as soon as water is brought across the Narrows, it can be turned on the main streets without delay. The 16-inch pipes leading from the south shore of the Narrows to the Coal harbor bridge, a distance of one mile, across the park, still require to be laid. The trenching work there is completed. The company are still expecting advices of the barque Viola, carrying the balance of the small pipe. As yet no word has come of her, and the company are becoming anxious as to her safety. The non-arrival of this vessel with the pipes has put the company very much out in their calculations, and naturally delayed the work. Still they hope to have water turned on during the coming January. As far as the company are concerned they are only too anxious to get the work completed.

The Board of Works met on Friday, December 7, 1888, and beg to recommend—

3. That the City Engineer notify the Water Works Company to fill up certain holes in the streets and make other repairs necessary for safety, particularly at the corner of Pender and Granville streets and at the corner of Cambie and Hastings streets, and that said repairs be made at once, otherwise the city will be compelled to attend to it.

VANCOUVER CITY COUNCIL.

A Long and Tedious Session—Passing of an Important License By-Law—Grievances of the Hotel Vancouver.

The City Council met last evening at 8 o'clock. Present the Mayor and Aldermen Oppenheimer, Lefevre, Brighthouse, Coldwell, McConnel, Alexander, Clark, and Dougall.

The desk occupied by the late Alderman Humphries was draped in memory of the deceased.

The minutes of previous meeting were read and approved.

COMMUNICATIONS.

A lengthy letter was read from Mr. Lawson, C. E., submitting his report on the verbal instructions to examine into the manufacture of pipes at Victoria and the details of the Capilano waterworks, as follows:

Vancouver, 24th Nov., 1888.

To His Worship the Mayor and Council,
Vancouver, B.C.,

GENTLEMEN,—Agreeably to your verbal instructions, I went to Victoria to ascertain how soon the Albion Iron Works Co., who have the contract to furnish water pipes to the Capilano Water Works Company, would have their contract completed.

Through the kindness of James Orr, Esq., M.P.P., I was introduced to and admitted into the iron works aforesaid, and saw the machinery at work making the pipes.

The pipes are made of steel plate, ½ of an inch thick, fastened along the sides with a double row of rivets, and jointed at the ends with a single row at 1¼ inch centres and turned out in 24 feet lengths.

Punching the plates as well as riveting is all done by hydraulic power. The machinery is good and the work is done rapidly and well.

After the pipes are put together in 24 feet lengths they are dipped into a solution of hot pitch, which gives them a coating inside and out. But handling them so often from the time they leave the Albion Iron Works until they are laid and jointed in the ditch prepared for them along the Capilano River, it is impossible to prevent some of the pitch being rubbed off and presenting the bare plate to the action of the air, soil, or acids of rotten wood, as the case may be, and a plate of ½ of an inch in thickness does not leave a large margin for corrosion.

The 16-inch diameter pipes are all tested to a pressure of 300 lbs. per square inch, before leaving the foundry, and they, the company, engage to have the whole of the pipes completed by the end of December next, and from the number of feet they are able to turn out daily, I feel pretty certain they will accomplish it.

The next and most difficult part of the task at this season of the year is to get the pipes hauled to the spot, and laid and jointed, in the ditch dug along the river, from the narrows to the dam, a distance of 6½ miles nearly. This part of the work is under the energetic management of Mr. H. Keefer, the contractor, who is pushing the work as rapidly as possible. But with between four and five hundred tons of pipe, etc., to haul and to string along that distance, up some very heavy grades, on a road soaked by continuous rains, taxes the skill and patience of the contractor.

A pipe 20 inches in diameter will be laid from the dam to the stone tunnel, a distance of 12,793 feet, about 2½ miles, and a 16-inch pipe from the tunnel to the narrows, a distance of 2,200 feet, and it is proposed to lay 3 12 inch diameter pipes, cast iron, across the narrows, one of which is laid.

Fourteen hundred feet of pipe is already laid, leaving about 29,973 feet to lay to reach the dam.

For about one mile near the stone tunnel is very crooked, each bend requiring a cast iron elbow to connect the pipes, and the pipes being all in 24 feet lengths, a great many will have to be cut to fit the bends in the ditch so the laying of the pipes on this part will be slow work.

When they get a straight lead from six to eight hundred feet per day can be laid.

Owing to the weather it is difficult to calculate at what time the work will be completed. Judging from what is done and the work that remains to be done, I think all the connections between the dam and the south side of Burrard Inlet at the narrows will be made by about the 1st of April next.

It is calculated that the work on the south side of Burrard Inlet to connect with the Vancouver system of Water Works will be completed simultaneously with that on the north side viz., by about the 1st of April.

I have the honor to be Gentlemen,
Your obedient servant
JAMES LAWSON, C. E.

The Vancouver Water Works.

In June, 1885, some months previous to the incorporation of the City of Vancouver, and while yet the place that now bears that name was known as the Granville Town Plot, Mr. George A. Keefer, M. I. C. E., a civil engineer of standing and repute in the Dominion, and well known for his works in the Province of British Columbia, having much faith in the future greatness of the Western Terminus of the Canadian Pacific Railway, took into consideration the question of a water supply for the city he felt certain would speedily be established. A glance at the physical features of the country in the vicinity of the projected city showed him at once that a supply could not be advantageously and economically obtained on the south side of Burrard Inlet, on which the city was to be located, but must be obtained from some one of the large streams flowing into the Inlet from the lofty chain of mountains on the north side. Having arrived at this definite conclusion, on the 2nd December, of the same year, he placed in the field a large survey party, equipped at his own expense, and in charge of Mr. H. B. Smith, C. E. Under his direct superintendence the party surveyed the north and south shores of the Inlet from Moodyville to the First Narrows, sounded the Inlet thoroughly to ascertain the best possible crossing for a line of pipes, examined all the streams on the north side of the Inlet, and finally decided on the River Capilano, which falls into the Inlet at the First Narrows, as being the best available source of supply for the future city. An instrumental survey was made of this river from its mouth to the canyon, a distance of four miles up stream.

The results obtained from this survey were of such a satisfactory nature that Mr. Keefer had no difficulty in obtaining the co-operation of several prominent and enterprising capitalists in furthering the project he had conceived. These gentlemen were as follows: Messrs. R. P. Rithet, Thomas Earle, John Herbert Turner, John Irving, D. M. Eberts, all of Victoria, Josiah C. Hughes, of New Westminster and Frederick W. Foster, of Clinton.

In April, 1886, these gentlemen obtained a charter from the Legislature of British Columbia, authorizing the construction of the necessary works to supply the City of Vancouver (incorporated at the same time) with water obtained from the Capilano River, and in June, of the same year, a few days after the great fire which entirely destroyed the young city, placed a party in the field in charge of Mr. H. B. Smith, C. E., with instruction to obtain the best possible route for the mains of the proposed water supply from Carrall street in the city to a point on the Capilano River, which would be a sufficient altitude to ensure a gravity system of supply second to none on the continent. The information obtained from this second survey was eminently satisfactory, and construction would have been pushed forward at once had not the great fire left the young city in such a ruined state that the Company deemed it advisable to defer action till the following Summer. Accordingly in June, 1887, the Company, through their Chief Engineer, Mr. G. A. Keefer, issued instructions to Messrs. H. B. Smith, C. E., and C. L. McCannan, C. E., to stake out the final location of the line of mains from Carrall street to a point on the River Capilano, 6½ miles up the stream, which had been finally adopted as the most suitable point on the river from whence to draw the water for the supply of the city.

On August 23rd the first contract, that for clearing, close cutting and grubbing, was let to Messrs. Stevenson and McCraney, of Vancouver.

Up to December, 1887, the Directors of the Company had been provisional, but on the 21st of that month a permanent Board, which remains the same to-day, was formed. This Board comprised the following gentlemen: President, Capt. John Irving, C. P. N. Co.; Directors: The Hon. J. W. Trutch, C. M. G., Messrs. R. P. Rithet, Thomas Earle and D. M. Eberts. Mr. J. W. McCannan was appointed Secretary, Mr. D. M. Eberts Solicitor, Mr. G. A. Keefer, M. Inst. C. E., Chief Engineer, and Mr. H. B. Smith, M. Can. Soc. C. E., Resident Engineer.

The River Capilano is a mountain stream of considerable magnitude, being reported to be no less than fifty miles in length, and averaging for a distance of 7 miles up stream (the only portion which has as yet been surveyed) a width of 150 feet at low water. It rises in the snow-crowned mountains of the Howe Sound district and flows almost due south, emptying into Burrard Inlet at the First Narrows. Comparatively little is known of the source of this river, but all accounts of Indians and prospectors agree

in one particular, that the source is not a mountain lake, but the accumulated waters derived from melted snow and ice, falling from the mountain summit. Being a mountain stream it is throughout its whole course very rapid, averaging 5 feet per second, and falling at the rate of 70 to 100 feet per mile. It passes through many rocky canyons, some of which are not more than 15 feet wide, and whose walls rise vertically over 200 feet above the stream. Between these canyons the banks are low lying flats, heavily timbered. The bed of the stream is for the most part made up of huge boulders of granite, basalt and conglomerates. At rare intervals only can sand and gravel be seen.

As before stated, the Engineers of the Company located the point of supply for their water system 6½ miles up stream. At this point the river was carefully gauged and ascertained to be discharging at extreme low water an average of four hundred and fifty millions of gallons per 24 hours.

On January 24th, 1888, a contract was let to Messrs. H. F. Keefer and D. McGillivray, of this city, for the construction of a stone filled timber dam at this point of supply, which work these gentlemen completed in a most satisfactory manner on the 18th April. The difficulties encountered in carrying out this work were of no ordinary character. No road to the dam site existed. A mule trail had to be constructed and all plant and materials had to be packed into the works on mules' backs. The season was very inclement and frequent heavy freshets occurred in the river. The river could not be temporarily diverted, owing to the enormous cost of such a work in such a confined space. This difficulty was in a measure, however, provided for in the structure itself, the engineers having designed a row of horizontal openings through which the greater part of the river could flow during construction, and which were afterwards closed up by sheet piling.

The dam, as completed, is from land connection to land connection 385 feet long, 41 feet wide and 12½ feet high. The clear tumbling way is 165 feet long, and this is supplemented by a sluiceway 14 feet wide. The height of both abutments is 20 feet. The total cost exceeded \$15,000.

The reservoir created by this dam is, in the high water season, 380 feet wide by 700 feet long, and contains, approximately, 14 million gallons. At low water the elevation of the water flowing over the crest of the dam is 417½ feet above the lowest level in Vancouver, 317½ feet above the level of the C. P. R. Hotel, and 200 feet above the rocky headland at the Narrows, which is the highest level within the city limits.

The main from the dam for a distance of 2½ miles down stream is 22 inches internal diam., the ground passed over being a gradually descending flat. At the termination of this flat, a whinstone rock bluff stands in the way, through which in order to obtain sufficient fall, it has been necessary to construct a tunnel 280 feet long, 6 feet high and 4 feet wide. The total fall from the dam to the floor of the tunnel is 29 feet.

At the tunnel the 22 inch main ceases and a 16 inch main begins. This main passes along the face of an easy earth side hill for a distance of 1½ miles south of the tunnel. At this point a descending flat is reached, which is followed for 2½ miles till Burrard Inlet is reached. The total fall from the dam to the high water mark of Burrard Inlet is 417½ feet.

Burrard Inlet, where the mains cross is 1036 feet wide at extreme low water, 1237 feet at ordinary low water, and 2800 at extreme high water. The north shore is low and flat for a considerable distance inland. Between high and low water mark it is covered with cobble stones and soft mud. The south shore rises abruptly at high water mark to a height of 12 feet, and then extends in a level flat some distance inland. Between high and low water mark the bed consists of soft sandstone rock, which when blasted and exposed to the atmosphere readily disintegrates. The contour of the bottom of the inlet is a perfectly uniform curve of nearly 2½ degrees. The greatest depth at low water is 53 feet, and at high water 70½ feet. The "Bore" or tidal current varies from 4 to 9 miles per hour, the greatest velocity occurring 3 hours after low water. The force of this current may be realized when it is stated that a 9 inch manilla hawser stretched across the Inlet, and floating on the surface was broken by it.

At Burrard Inlet the 16 inch main connects with a 12 inch submerged main. In the near future three additional 8 inch mains will be laid across, which will also connect with the 16 inch main. These 4 mains will be laid in parallel rows 50 feet apart, and will each be provided with stop-cocks so that they may be capable of independent action.

On the south side of the Inlet the submerged main connects with a 16 inch main, which latter passes over the uniform flat known as the Stanley Park, a distance of one mile. Here the long, narrow, shallow, and muddy bay known as Coal Harbor is reached. Coal Harbor is 250 feet wide at low water and five feet deep, and across this two 12 inch mains are laid. At the south side of Coal Harbor the inhabited part

of Vancouver is reached. Here a 16 inch main connects, and this main follows the south side of Georgia street to the C. P. R. Hotel on Granville Street; thence on the north side of Hastings Street to Cambie Street, thence on the north side of Hastings and Oppenheimer Streets to Westminster Avenue, which is the present terminus, and which is 10 miles from the point of supply on Capilano River. The total fall to this point is 377 feet, corresponding to a pressure of 164 lbs to the square inch.

The 22 inch and 16 inch mains are of mild steel plates, rolled and riveted. Each length is 23 feet long, the 22 inch pipe weighing 736 lbs per length, and the 16 inch 552 lbs. The plates are 11-100 inches thick and have a warranted tensile strain of 72,000 lbs per square inch. The joints are of the Smith and Moore Pattern—that is, a band of steel 6 inches wide and ¼ inch thick, encircles the junction of two lengths, the space between the band and the pipe being filled up with lead and well caulked. The play between the band and the pipe is sufficient to admit of an angle of 2 degrees. Large angles are turned by means of special bands and castings. Each length is well coated inside and outside with asphaltum and coal tar. The contract for the supply of these plates was let to Messrs. Welch, Rithet & Co., of Victoria, in September, 1887. On the same month the Company contracted with the Albion Iron Works Company, of Victoria, for the manufacture of the plates into pipes, and for the laying of that part of the mains between Burrard Inlet and the Capilano Dam.

The 12 inch submerged pipes, which cross Burrard Inlet at the First Narrows, are of the pattern known as Ward's Flexible Joint Pipe. They are of hard, close grained, white cast iron, thoroughly coated with Dr. Smith's coal pitch varnish. Each length is 12 feet 4 inches over all, 11-16 inches thick, and weighs, without the lead in the joint, 1,280 lbs. Each joint required 70 lbs of the best Spanish pig lead. The bell or faucet end of the pipe is bored out truly to form the middle zone of a sphere, and the spigot end of the pipe fitting into it is cast with two raised collars. The inner collar is of such a height as barely to allow it to pass into the faucet. The outer one is a little

lower so as to allow the moulten lead to be poured in. The extreme end of the spigot is turned truly and exactly fits the spherical zone. This joint when made is capable of moving through an angle of 12 degrees, so that a complete circle can be made with 30 lengths.

The contract for laying the submerged pipes across the Narrows was let on the 1st November, 1887, to John F. Ward, C. E., late Chief Engineer of the Jersey City Water Works, and the inventor and patentee of the above mentioned flexible joint pipe. This gentleman's specialty for many years has been laying submarine water pipes. Among some of the works he has successfully completed may be mentioned the 6-inch pipe crossing the Delaware River at Easton, Pa.; the two lines of 8-inch pipe across Shirley Gut, near Boston, and the 12-inch pipe above the dam at Lawrence, Mass. From the reputation this gentleman had gained, and his assurances to the Company that the laying of a pipe across Burrard Inlet at the point selected by the Company's Engineers was a matter unattended with any difficulty, it was never doubted but that he would be equal to the task he had undertaken. On his arrival in Vancouver, on April 20th, and after having examined the crossing, he reiterated his statement to the ease with which the work could be accomplished, and in a few days thereafter he began active operations.

On the north side of the Inlet he built at low water a frame-work staging, strong enough to resist the rise and fall of the tide, and suitable for the work of joining the pipes. The pipe lengths were distributed conveniently near. The first length of pipe was put in position at the rear of the platform. To the south end of this pipe was attached a continuous wrought iron rod of 1½ inches round iron, which reached clear across the Inlet and was connected by cable with a drum, revolved by a 30 horse power engine. This rod was made from round iron in lengths of 12 feet, coupled together by means of screwing. Its whole strength was only the total amount of resistance to stripping offered by the thread of the screw. When a second length of pipe had been joined to the first length, the engine on the south side pulled the first length forward a distance equal to its own length. When a third had been joined to a second the engine again pulled forward the first (with the second and third attached to it) a distance equal to its own length. This operation was repeated until 18 lengths of the 105 contracted for had been submerged. Mr. Ward then concluded to make use of a steel cable, but was obliged, on the plea of extremely urgent business, to leave the works on June 7th for St. Paul, Minn. Mr. F. Little, Mr. Ward's superintendent, was left in charge during his absence, but owing to lack of funds was obliged to cease work after a few days. Mr. Ward did not return from St. Paul, but shortly afterwards officially abandoned his contract. Such debts as he incurred for material and labor

are as yet unpaid. Whatever Mr. Ward's reasons may have been for thus abandoning a work, the successful completion of which would most assuredly have added fresh laurels to his name, the outside world are perfectly justified in believing that he found the undertaking beyond his skill. His behaviour in the matter has been most reprehensible. Possessing as he did a high reputation for similar works accomplished, and his own confidence in the non-existence of the slightest difficulty at the crossing of the Narrows, the Company naturally placed every reliance on him. That they have suffered pecuniarily to a large extent, is beyond question. The City of Vancouver has also suffered, inasmuch as his complete failure to carry on his work to a conclusion has caused a very considerable delay in the completion of the water supply.

No further steps towards laying the submerged mains were taken till July 9th, more than a month after Mr. Ward had abandoned his work. On that date, however, the Company entered into an agreement with Messrs. H. F. Keefe and D. McGillivray, of this city, wherein these gentlemen undertook for a stated lump sum to lay the pipes across the Narrows and to construct all the works between the Narrows and the point of supply. They agreed to expend ten thousand dollars in laying the submerged mains, all of which was to be forfeited in case of failure, and the pipes made good to the Company.

Messrs. Keefe and McGillivray, although entirely unaccustomed to this particular class of work, entered into the fulfilment of their contract with energy, entirely disapproving of the feeble attempt made by Mr. Ward and his mode of procedure, and their first step was to undo all he had already done. The eighteen lengths he had submerged were hauled back onto dry land. The general plan adopted by them was to joint all the pipes on dry land in one continuous row, and by the aid of powerful machinery pull the whole 105 lengths across the Inlet at one time. A trench 3 feet deep 4 feet wide and 1200 feet long was excavated on the line of the crossing on the north shore. Continuous runners of barked firs were placed in the bottom of this trench. On these runners 100 lengths (5 lengths having been found defective were discarded) of the flexible pipe were jointed in one continuous line. Each length was provided with a wrought iron ring encircling the pipes, to which buoys of 500 lbs. buoyancy were attached. To the extreme south end of the line of pipes, that is the end nearest the water, was attached a large float built of cedar logs and capable of floating that end when immersed.

The hauling gear was as follows: To the north end, that is the end farthest from the water was attached a 9 inch manilla cable, 1200 feet long, which was connected with a 25 horse power engine stationed at low water mark on the same shore. To the middle length of the pipe was attached a 1½ inch diameter steel cable, 1876 feet long, which connected with a 30 horse power engine stationed on the opposite shore. Midway between the middle length of the line of pipes and the extreme south end, a similar steel cable 1586 feet long was attached. This cable connected with a 25 horse power engine on the south shore. A third steel cable of the same diameter and 1310 feet long was attached to the extreme south end of the line of pipes and this cable connected with two 25 horse power engines on the opposite shore. It will thus be seen that there were no less than three heavy steel cables and one heavy manilla cable attached to the line of pipes, and they were connected with engines aggregating 130 horse power.

A few days previous to the work of hauling this long line of pipes across the Inlet, a test pressure of 300 lbs. to the square inch was applied by means of a steam pump. Under this pressure, 8 lengths were found to have sustained fracture in a greater or less degree during their repeated handlings, and were consequently removed, thus leaving only 92 lengths, weighing, lead included, 55½ tons.

For the further information of the Company, Mr. H. B. Smith, the resident engineer, again examined the bottom of the Inlet, taking soundings at every five feet, and dragging the lead on the bottom all the way across. The result was in every way satisfactory. The contractors in their own interests secured the services of a bold and skilful diver, Mr. Richard

Llewellyn of this city who undertook to walk across the bottom of the Inlet and report thereon. Mr. Llewellyn actually accomplished this feat, entering on the south side and emerging on the north side, a total distance of 1086 feet at extreme low water, traversing the whole distance in 30 minutes. The hazardous nature of this undertaking can only be realized when it is known that experienced divers had stated that it could not be accomplished owing to the velocity of the current and the short duration of slack water. All credit is due to Mr. Llewellyn, and it must always be a feather in his cap that his reliance on his own professional skill was not misplaced.

He stands to day the only diver who has walked from shore to shore of the First Narrows of Burrard Inlet.

On the 28th August last at 10 A. M. the engines connected with the cables attached to the long line of pipes lying on the side-way on the opposite shore commenced to pull. Immediately the cables straightened out and remained taut and stationary, but only for a few seconds, for a sudden slackening took place, and the excited spectators were assured of the fact that the mains had started on their long journey across. Owing to the cramped nature of the ground when the engines were located, the blocks and tackle connecting the steel cables with the supports on land had to be overhauled every advance of 56 feet that the mains made. The process of hauling was therefore necessarily slow, but at 7 p. m. amidst ringing cheers and hurrahs the chief engineer announced that the Vancouver Waterworks Company's main had reached its destination on the south shore of the Inlet, and that the great work of crossing the Narrows was an accomplished fact. Immediately thereon, though darkness was rapidly coming on, Diver Llewellyn started on his second journey across the bottom of the Inlet, cutting loose as he went the floats and buoys that attached to the pipe. Next day, the 29th, he again walked across for the purpose of reporting, to the contractors the condition in which the pipes were lying. This report was eminently satisfactory and was to the effect that the whole line of pipes were lying in a perfectly straight line, without sag or bend, that the pipes as they were being pulled over, had cut a deep groove in the soft sandstone rock, and that already considerable silt had gathered above and below the pipes. He gave it as his unqualified opinion that in a few weeks the pipes would be entirely covered over, and that their permanency and safety was beyond question.

On August 30th in accordance with their agreement that the pipes should be tested after being submerged, the contractors applied in the presence of the Company's engineers a final test pressure of 300 lbs. per square inch. This proved entirely satisfactory. The pressure was steadily maintained for some minutes and the leakage under it found to be almost nil. The chief engineer then signified his final acceptance of the work on behalf of the Company.

The Company, so that the condition of the pipes should be beyond the slightest question, secured the services of the well known Victoria diver, Mr. T. Harmon, who on September the 5th and 6th made a thorough examination, and reported most favorably, verifying Mr. Llewellyn's report in every particular.

When it is understood that a contractor for similar works like Mr. John F. Ward, C. E., of Jersey City, whose reputation has long been established all over the continent, abandoned this work after having exercised his ingenuity from the 25th April to June 7th in an abortive attempt to carry it to a conclusion, and that so many otherwise intelligent men, including engineers in their number, gravely argued day by day, staking their reputations on their statements that the satisfactory completion of the work was an impossibility, too much credit cannot be given to Mr. Keefe and McGillivray, who, though well known and successful contractors in other works, were altogether unaccustomed to laying submerged mains. Yet, notwithstanding, they undertook to accomplish this work, entering into a most rigid contract with the Company, accepting all the risks, and binding themselves under heavy penalties. These gentlemen may well be proud of the satisfactory result of their labours, and may pardonably exult in having by their skill and forethought triumphed over so many difficulties.

The contract for the supply and delivery at Vancouver of sub mains, consisting of 150 tons of 8-inch, 300 tons of 6-inch, and 160 tons of 4-inch cast iron pipes, as well as 23 tons of 2-inch, and 1 ton of 2½-inch welded wrought iron pipes was awarded to Messrs. Welch, Rithet & Co., of Victoria, in September, 1887.

The 8-inch, 6-inch and 4-inch cast iron pipes have now been distributed and laid. The 8-inch is 9 feet long, 43-100 inches thick, and weighs 418 lbs. per length. The 6-inch pipe is 9 feet long, 46-100 inches thick, and weighs 277 lbs. per length. And the 4-inch pipe is 9 feet long, 50-100 long and weighs 167 lbs. The work of excavating trenches, and laying of sub mains, including the placing of all necessary gates, valves, hydrants, etc., has been completed.

The general plan of the distribution system was designed by Mr. T. C. Keefe, C. M. G., president of the American Society of Civil Engineers. With this as a groundwork, the Company's engineers have perfected a plan for water service, which will be unexcelled on the Pacific coast. The following details will be of interest to the people of Vancouver.

Eight-inch pipes have been laid on Cambie street from Pender to Water; on Westminster avenue from Hastings to False Creek bridge; on Hastings street from Westminster avenue to Carl avenue; and on Granville street from Georgia to Davie.

Six-inch pipes have been laid on Burrard street from Georgia to Hastings; on Pender street from Burrard to Cambie on, Hastings street from Burrard to Westminster avenue; on Cordova street from Howe to Carrall; on Powell street from Carrall to Boundary; and on Oppenheimer street from Carrall to Carl.

Four-inch pipes have been laid on Granville, on Seymour, on Richards and on Homer streets from Pender to Georgia, on Carrall street from Water to Hastings, on Dupont street from Carrall to Westminster avenue, on Oppenheimer and on Alexander from Westminster to Carl avenue, on Powell st. from Boundary to the east boundary of Lot 182, and on Georgia street from Granville to Bute. 2½ inch pipes will be laid on Carrall street from Dupont to the Royal City Planing Mills. 2 inch pipes will be laid on Hornby, Howe, Hamilton and Cambie streets from Pender to Georgia streets, on Davie Street from Granville to C. P. R. Round House, and Drake street from Howe to Homer, on Pender street from Cambie to C. P. R. machine shops, on Alexander street from Carrall to Westminster Avenue, on Keefe, Harris and Barnard streets from Westminster avenue to False Creek, and on Prior from Gore to False Creek. This will give a total distribution system of 11 miles in length, which is amply sufficient for the present needs of the city. The Company expect at an early date to receive an additional supply of 4 inch, 3 inch and two inch pipes which will be laid in other streets as occasion may occur. The system is liberally supplied with gates, so that in case of breaks or necessary

repairs, a single street or part of a street may be shut off without interrupting the supply to other parts of the city.

It is expected that 75 hydrants, judiciously placed, will be ample fire protection. A plan showing the Company's location of that number was laid before the City Council. The number they have decided on is 62, and these have been placed in position.

It is confidently expected that the whole of the works will be completed and in operation by the 1st of April, 1889. The City of Vancouver will then be in possession of a system of water supply second to none on the continent, and its people may well be gratified to know that the shrewd, far-seeing men who comprise the directorate of the Vancouver Water Works Company have, and have had, since the day the city was first incorporated, so much faith in its future greatness, that they have unhesitatingly expended from their own capital (not a dollar being borrowed) such a large sum as the total cost of the works will amount to, viz. two hundred and fifty thousand dollars.

THE WATER WORKS SYSTEM.

Yesterday morning the steamer Mande brought from Victoria the last consignment of pipes which the water works company of this city will require for the completion of their system. Operations will accordingly be immediately resumed and it is expected that the work will be completed before the close of next month. The 16-inch main has already been laid from Burrard Inlet to the Rock Tunnel, a distance of four miles. This portion of the work was by far the most difficult. Indeed it was here that all the engineering difficulties had to be surmounted and henceforth the labor will be comparatively light. Beyond this point the work of excavating trenches has been going on and the laying of the 22-inch pipes, which here begins, will commence immediately. The distance to be laid north of the tunnel is $2\frac{1}{2}$ miles, and, being along the river flats, is the easiest portion of the work.

The mains for the city are also on hand, and the work of laying them will start to-morrow. Operations will be begun on Granville street. Everything is now running smoothly and the work is being pushed forward as rapidly as possible.

The Water Works.

The present weather is most favorable to the Water Works Co. for the laying of their pipes. The consignment of pipes received yesterday morning will immediately be made use of. The 4-inch pipes throughout the city are nearly all laid, and there are only a few streets left on which 23-inch temporary pipes will be laid. In all about 10 miles have been put down in the city. The system will probably be extended by about four miles more. The cause of the delay has chiefly been the non-arrival of the 16-inch pipes. The steel plates for these were originally sent in bond from England via New Orleans, instead of by sailing vessel, resulting in two or three months' delay. They were not forwarded from New Orleans until several communications had passed between the Consul at that point and the British Consul at Liverpool. The steel plates are now being riveted as fast as possible at the Albion Iron Works. Had it not been for the delay regarding the 16-inch pipes, the water would have been in the city by this time. If the pipes were all on hand the whole of the connections could be made in six weeks.

CITY COUNCIL.

City Fathers Settled Down to Work-- Resolutions Passed Relative to the Waterworks--A Number of Reports Read and Passed--North Arm People Want Better Roads.

The City Council met last evening, the following members being present: Ald. Lefevre, Clark, Brewer, Brighouse, McConnell, Oppenheimer, Costello, Salsbury, Whetham and Horne. In the absence of the Mayor, Ald. Lefevre was moved to the chair.

The following were the communications: from R. P. Cook, F. C. Innes, and Geo. Turner, the official trustees of the Vancouver Street Railway Company, requesting that their charter be so amended as to permit of the construction of section number two of the street railway in two years and section number three in three years, to give the company ample time for the completion of their agreement, and to remove the conditions whereby the by-law is not to come into force until \$40,000 of the company's stock is taken; from J. W. McFarland, secretary of the Waterworks Co., stating that everything possible was being done to complete the work, and that the company expected to have the system in operation by the 1st of March next, subject to the weather being such as would enable the contractors to proceed without interruption.

In reference to the communication from the secretary of the Waterworks, Ald. Horne said it was time that the city took action in the matter. There had been enough humbering on the part of

the Company, and he would suggest that unless a guarantee were given that the system should be at once completed the city construct and operate a system of its own.

Moved by Ald. Horne, seconded by Ald. Whetham, that whereas the Capilano Waterworks Company did promise and represent to the citizens and the council of the city of Vancouver in 1836, that they would have their water service brought into this city and ready to supply all parts of the city with water early in the year 1887;

And whereas the Capilano Water Co'y. agreed to guarantee the fulfilment of their promises by putting up the sum of \$10,000 cash as a forfeit in the hands of trustees to be selected from the citizens of Vancouver the same to be forfeited in case the company did not have their water service ready for use throughout the city early in 1887;

And whereas these with other representations made by said company caused the citizens of Vancouver to reject the other water company's scheme, who were prepared to furnish the city with water early in 1887 and to give the necessary security for same;

And where as the Capilano Waterworks Co'y. have not put up the guarantee promised or any guarantee of any kind;

And whereas they have failed to carry

out their promises agreeing to have this city supplied with water in 1887 and at other dates set by them in 1888;

Therefore, be it resolved by the Mayor and Aldermen in council assembled, that unless the Capilano Waterworks Company give to the city of Vancouver a guarantee bond for double the amount they agreed to put up in cash guaranteeing to this city that they will have their water service brought into the city and ready for use throughout the city within three months from this date, that this Council will take the necessary steps to raise a loan to construct and complete a system of waterworks to be built, owned and managed by the corporation of the city of Vancouver; and that a committee be appointed to wait on the Capilano Waterworks Company to ascertain if they will give the guarantee required and report to this Council at the next regular meeting. Carried.

Moved by Ald. Horne, seconded by W. F. Salsbury, That the Board of Works be instructed to fix all crossings torn up by the Capilano Waterworks Company at once at their expense, if the Water Company fail to do so within 3 days. Carried.

NOTICES OF MOTION.

Notice of the following By-Law was given by Ald. Horne:

I hereby give notice that I will introduce a by-law at the next meeting of this Council authorising the Mayor and Council of the city of Vancouver to raise by way of a loan a sum of money sufficient to construct, complete, and operate a system of waterworks to be built, owned and managed by the city of Vancouver.

WEDNESDAY, JANUARY 23, 1889.

We presume that Alderman Horne will explain fully at the next meeting of the City Council the reasons which have induced him at this particular juncture to bring forward a motion to introduce a by-law authorising the Council to negotiate a loan in order to raise money to construct and operate a system of waterworks for this City. It would seem scarcely possible that such a motion would be proposed unless there were certain circumstances which made it desirable in the interests of the City that such action as Alderman Horne contemplates should be taken. We must therefore assume that the worthy Alderman is in possession of facts of which the general public is ignorant, and which convince him that the scheme of the Vancouver Water Works Company is either a failure, or that the Company has no intention of completing an undertaking on which it has already expended many

thousands of dollars. Except on such a supposition the action of Alderman Horne is not only without justification, but it is one that calls for the disapprobation of every sensible man who has at heart the best interests of Vancouver. It would, indeed, be an unfortunate circumstance if the history of the Council of two years ago should be repeated now. Those who were residents of Vancouver in the commencement of 1887 will not have forgotten the weeks and months which were wasted by the Council in its weary discussions of proposals for assisting a corporation to provide the City with a water supply and the manner in which, after the Council had finally arranged the terms, the voters most emphatically declined to endorse the scheme. There is not the least reason, with the knowledge of the progress that the Vancouver Water Works Company has made towards the completion of its enterprise, to suppose that the ratepayers would not reject, even by a much larger majority than in 1887, any proposal looking to the initiation of a scheme of waterworks to be constructed by the City itself. The only reason, as we have said, which could make it possible that such a proposal could be approved, would be that the scheme now in progress was demonstrated to be a failure.

While, however, we can scarcely suppose that Alderman Horne would propose such a motion as that he gave notice of on Monday evening unless he possessed information not generally known, we are rather inclined to think that he may have acted under some misunderstanding of the present state of affairs from the fact that he appears to be altogether ignorant of some of the most important details connected with the memorable contest of 1887. This is shown by the resolution which he also moved on Monday last respecting the Capilano Water Works Company. We presume the worthy Alderman intended in his resolution to refer to the Vancouver Water Works Company, which is proposing to obtain a supply of water from the Capilano River, and in this case we would suggest that his resolution be properly amended at the next meeting of the Council, since, as it stands now, it is, of course, void, there being, as far as we are aware, no company answering to the description in the resolution. But putting this technicality (important though it is) aside, the resolution itself is entirely inaccurate in the facts it states. The Vancouver Water Works Company never did put up \$10,000 as a guarantee that it would furnish a supply of water to the City in 1887. It did on June 3d, 1887, deposit in the names of three trustees--citizens of Vancouver, in the Bank of British Columbia, \$10,000, as a guarantee that if the City, as soon as it could do so, should desire to enter into a contract with the Company, similar to a proposition made by the latter to the former in the preceding month of March, 1887, that the Company would make such a contract with the variation that the time fixed as that upon which the Company should be prepared to supply the City with water should be June, 1888. This \$10,000 remained in escrow until the latter part of 1887, when as the City had not exercised the option offered, the trustees decided to release the money and relieve all parties of any further liability. This is a correct statement of the matter, and it will be seen that the resolution carried in the Council on Monday last was altogether at variance with the facts.

Its i, therefore, possible that Alderman Horne took the action he did under a misconception of the real facts, and, should such be the case, he will doubtless see that the course most likely to serve the interests of the City will be to

THE WHOLE SCHEME

Briefly Outlined from its Inception to the Present Time—What the Officers of the Company Have to Say.

1889
defer any further action in the matter until it can be seen whether the Vancouver Water Works Company is likely to be in a position to furnish a supply of water by March 1st next, the date named in a communication received by the Council from the Company's secretary. Although the Company has not been fortunate enough to complete its undertaking as soon as it expected, no one will pretend to deny that many of the circumstances which caused the delay were matters entirely beyond its control. It is also worthy of comment that the "bugbear" which played such an important part in 1887—the laying the pipes across the Narrows—has been successfully dissipated by home talent and enterprise and the only serious objection made to the scheme two years ago has been proved to be as utterly without foundation as we always insisted it would be found to be. We do not say that action of any kind which might seem to be designed in a spirit of hostility to the Company, should be deferred on account of the enterprise which it has certainly shown. The promoters of the scheme went into the matter as a commercial speculation, and they must be prepared to take all the chances which attend upon such an undertaking. Neither do we say that any special consideration should be shown to the Company or its contractors if their employees or agents have not properly reinstated the roadways or sidewalks disturbed by them in the operation of laying the water mains. We consider that the Company should be kept strictly to a compliance with its agreements in this respect.

But what we are anxious is that the new Council should not commence its career by perpetrating a blunder which, in diplomatic parlance, would be worse than a crime. Anyone interested in real estate in this City will see that it will have a most injurious effect on the business of the coming season if outside investors are told that the Council has decided to lay a heavy burden upon the taxpayers to build water works when a private company has already practically completed a system ample to supply the City for many years, and that in consequence the result of the Council's action will be a large addition to the municipal debt and the maintenance of a system which, in face of the certain competition, must involve a heavy annual outlay for many years to come. We do not believe that the scheme outlined by the resolution of Alderman Horne is likely to become an accomplished fact, as the taxpayers have to decide that, and they will always be found able to supply any amount of common sense lacking in their representatives in the Council. But before the time comes for the voters to exercise their power, immense injury will have been done to the interests of the City by the uncertainty which will prevail regarding the imposition of heavy and unnecessary burdens, and a year which should be the most prosperous in the history of Vancouver will prove to be one of disappointment and of that hope deferred which maketh sick the heart both of owner and speculator.

As the subject of the water works is at present agitating the minds of the citizens of Vancouver, a representative of THE WORLD had an interview yesterday morning with the Secretary and other officials of the Company in order to ascertain the facts relating to the subject. It is but two years and a few weeks since the subject of water-works was first broached at the Council meetings.

On January 4th, 1887, Ald. Oppenheimer moved, seconded by Ald. Lefevre, that the City Clerk be instructed to communicate with the agents of the two incorporated companies to supply the city with water and ask them to lay their respective plans before the Council, either by writing or personally, on or before the meeting of the Council to be held on the 10th inst. (January 1887.)

The present company had been incorporated as the Vancouver Waterworks Co. on the 6th of April 1886, with a capital stock of \$250,000. A proposition submitted by the company first came up for consideration at the deliberations of the Council on Jan. 21, '87. This proposition, subsequently issued in printed form and dated the 14th March, 1887, was submitted to the Council.

The prospectus embraced seven clauses. The most important ones, however, are clauses 5, 6 and 7, as follows:—

"5th. They (the Company) will have a sufficient supply of water for all purposes for the city within 18 months after the agreement hereinafter referred to has been entered into."

6th. They will agree to sell the said Water Works to the City at any time for a fair valuation to be settled by arbitration (according to the arbitration clause in their Act of incorporation) together with 20 per cent. added to the sum that may be arrived at by the arbitrators or umpire, and in addition paying to the Company an amount which, together with the annual dividends of the Company, will be equal to 10 per cent. per annum on the amount invested from commencement of expenditure on the works to the date of transfer to the city.

7th. They will agree that all moneys (if any) that may be paid by the city on the guarantee hereinafter mentioned shall be a debt due by the Company to the City, and shall be repaid to the City from the receipts of water rates, when such shall have increased sufficiently to admit of such payment being made, and for such purpose the Company will give to the City a lien on such water rates. In consideration of such undertaking by the Company the City of Vancouver shall enter into an agreement with the Company, that so soon as the works are completed and in successful operation, to guarantee to the stock or debenture holders in the said Company three (3) per cent per annum on the cost of construction of said works, such guarantee to extend over a period of ten (10) years from the date of completion of the said works, and shall not be on a greater sum than two hundred and seventy-five thousand dollars, (\$275,000) and shall always be subject to the proviso that the works shall be kept in efficient operation."

The merits of the respective Coquitlam and Capilano schemes were discussed in Council on January 21st, 1887. It is claimed by the Water Works Company that it would necessarily have taken the Council three months to pass a by-law in reference to the agreement. Had the agreement been accepted it would have dated from about the 14th of June, 1887. When the 18 months specified are added to this, the date for the agreement to run out would have been last December, one month ago. If this contention is valid, the dates named in the resolutions passed by the Council are not strictly correct. In accordance with their proposition, the Water Works Company deposited a cheque for \$10,000 with the Bank of British Columbia in this city on June 3, 1887, as a cash guarantee of good faith in relation to the agreement. The following is the full text of the Water Works Company's letter to J. C. Keith, Manager of the Bank of British Columbia, and the release of the above-mentioned cheque:

VANCOUVER, June 3, 1887.

J. Cooper Keith, Esq., Manager Bank of British Columbia, Vancouver.

DEAR SIR:—Enclosed please find my cheque for Ten Thousand Dollars (\$10,000) payable to the order of Thomas Dunn, Isaac J. Hayden and F. O. Cotton, as trustees. The arrangement is that the Vancouver Water Works Company are to give a bond in the above sum with approved sureties, to the above named gentlemen as trustees, that if the Corporation of the City of Vancouver will accept within 30 days from the time they are in a position to accept the same, the proposal of the said company of the 14th of March last, with the following variations, viz: That the said company shall construct and complete their works within one year from the 1st day of June, A. D., 1887, and shall construct and complete the same, subject to unavoidable contingencies and without any guarantee from the city

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and the said company shall enter into a contract with the city in accordance therewith, then the said bond to be void.

The understanding is that you are to hold the above sum of \$10,000, until the bond above mentioned is handed to the trustees, and you have their written acknowledgment to that effect, when the same is to be returned to me.

In case the penalty under the said bond shall at any time become due, the amount paid, or recovered there under, is to become the property of the City of Vancouver, and is to be paid over to them.

Yours truly,
(Signed) JOHN IRVING,
For Vancouver Water Works Co. (L'd.)

Endorsed on back of foregoing is the following:

January 3, 1888.

To J. C. Keith, Esq.:

We hereby release the enclosed mentioned cheque.

(Signed) THOS. DUNN.
F. O. COTTON.
I. J. HAYDEN.

It will thus be seen that the cash guarantee of \$10,000 was actually deposited and subsequently released.

As the Company has also been accused of paying the Albion Iron Works exorbitant prices for the work done, with a view of getting it all back with interest at a subsequent date from the city, it is stated that originally general tenders for the work in connection with the steel mains were called for both in British Columbia, England, Scotland and elsewhere. The celebrated firm of Duncan Bros., London, was invited to tender. Their figure was, however, much too high. The figure quoted by the Albion Iron Works was by far the lowest and they accordingly were awarded the contract. Tenders were in fact invited for all work done by the Company, the contract in each case being awarded to the lowest tenderer. When T. C. Keefer, C. E., was in Vancouver he made an elaborate report on the system. He recommended that all necessary work, such as riveting and so forth be done as far as possible on the spot. The Vancouver Foundry and Iron Works were not in a position then to do the work which consequently had to be turned out by the Albion Iron Works at Victoria.

The tenders for the work on the dam were first called for on the 23rd December, 1887; and on May 5th, 1888, tenders were called for all works from Burrard Inlet to the dam, which had been built in the interim. This work is being carried out by Keefer & McGillivray. The contract for the chopping, close-cutting and clearing had been called for on the 5th August, 1887, and was awarded and carried out by T. Stevenson and H. P. McCraney. A special stipulation of this contract, which was carried out to the letter, was that no Chinese should be employed on the works.

Addressing his remarks to the energetic Secretary, the representative of THE WORLD asked what the Company thought of the request regarding a guarantee bond for \$20,000 as embodied in Ald. Horne's motion. The answer he received was to the effect that the demand was considered a most unreasonable one. The directors of the Company have in the meantime been communicated with and the Secretary was not prepared to say what action they might see fit to take. The certainty of the completion of the work within a specified time would, at this season of the year, depend entirely on the state of the weather. It is impossible for the work to progress satisfactorily in a perfect downpour of rain. Still, the Company, in the words of the Secretary's letter, read at the last Council meeting, "fully expects to have the work completed and in operation by the 1st of March next," subject to unavoidable delays from inclement weather.

It might be stated that in the original instance tenders for the work were advertised for in Seattle and elsewhere; thus in no way limiting the opportunity of getting the work done in the best and most economical way possible. It may also be stated that there have been three unexpected and unlooked for causes of delay, the Company having lost much valuable time thereby. The first of these was the unwarrantable detention at New Orleans, U.S.A., of the machinery for rolling and rivetting the plates. Through the agency of the British Consul at Liverpool, the machinery referred to had been shipped in bond via New Orleans, but unaccompanied by Customs invoices. This caused a great deal of correspondence and resulted in a delay of several months. A second cause of the delay was the unexpected throwing up of the contract for the laying the flexible-jointed pipes across the Narrows, by J. F. Ward, who held the contract. Legal difficulties had to be overcome and the contract re-let, all of which took time and caused additional delay. These unfortunate occurrences prevented the Company from completing the work before the wet season commenced. Every one here knows, especially those engaged in public works, what that means, and how difficult it is to prosecute work satisfactorily during inclement weather.

CANADIAN ENGINEERS.

List of Officers Elected Includes Ottawa Delegates.

THE GOVERNOR-GENERAL PRESENT

Growth of an Important Body—Annual Report Adopted.

Montreal, Jan 18.—At the third annual meeting of the Canadian Society of Civil Engineers Mr. Samuel Keefer, of Ottawa, president, occupied the chair. About sixty gentlemen were present, among them being Col. Gzowski, president elect, E. P. Hannaford, H. T. Perley and F. H. Gisborne.

The membership of the society has increased since last year by eighty-four. The total number now on the list is 542.

The total sums promised for the building fund is now \$1,251, of which amount \$1,809.25 has been paid to the treasurer. The income for last year was \$2,777.64, and the general expenditure \$1,789.64 leaving a balance of \$988, which with the balance of \$990.92 brought forward from 1887 gives \$1,948.02 to be carried forward.

The Nomination committee for 1890 was appointed as follows: R. Forsyth, Montreal; P. S. Archibald, New Brunswick; E. A. Horn, Quebec; H. B. Smith, Vancouver and J. H. Taylor, Kingston.

At the afternoon session the Governor-General graced the assembly by his presence. Prof. Bovey read an address, which was beautifully illuminated, to which his Excellency appropriately replied.

ELECTION OF OFFICERS.

The election of officers resulted as follows: President, Col. C. S. Gzowski; vice-presidents, E. P. Hannaford, H. F. Perley, P. A. Preston; treasurer, H. Wallis; secretary, H. T. Bovey; librarian, F. Chadwick. Members of council: Messrs. J. D. Burnett, H. Blackwell, F. N. Gisborne, J. Kennedy, G. F. Baillairge, St. G. Boswell, E. Gilpin, M. Murphy, E. Wragge, M. J. Jennings, F. R. F. Brown, D. B. McConnell, J. E. Vanier and G. A. Keefer.

When the Council assembled last evening the public portion of the hall was crowded to excess by citizens who had betaken themselves thither with the evident intention of closely watching the action of the members on the questions of interest which were expected to be brought forward. Throughout the meeting the spectators evinced the greatest interest in the proceedings, and frequently testified their approbation of the stand taken by this or that councillor.

Mayor Oppenheimer presided, and the following members were present:—Aldrs. Salesbury, Clark, Whetham, Horne, McConnell, Oppenheimer, Brewer, Lefevre, Costello and Brighthouse.

COMMUNICATIONS.

OFFICE OF THE
VANCOUVER WATER WORKS CO.,
Vancouver, B. C., Jan. 26th, 1889.
THOS. F. MCGUIGAN, Esq., City Clerk,
Vancouver, B. C.

DEAR SIR,—I am in receipt of your favor of the 22nd inst., embodying Alderman Horne's resolution relative to this Company, and in reply thereto I beg to inform you that I have been instructed by the Directors of this Company to hand you herewith copy of a resolution carried by them at a meeting held on 24th inst.

With reference to the last clause will you kindly appoint a day which will be most convenient for the Aldermen to meet a deputation of our Company and inform me at your early convenience of the day chosen.

I am, dear sir,

Yours faithfully,

J. W. McFARLAND,
Secretary.

"Moved by Mr. Rithet, seconded by Mr. Earle, and carried, that the secretary be and is hereby instructed to acknowledge the receipt of the communication of the City Clerk, dated January 22nd, with reference to the completion of the Water Works of that City, and to state that the

directors of this Company deeply regret that Alderman Horne should have seen fit to use language imputing the Company's motives and stating "that there had been *humbugging* enough" (as per newspaper reports) when, had he duly considered the matter, the Directors feel sure, he could not have made use of such language.

"That the Directors would call attention to the following inaccuracies in the resolution moved by Alderman Horne:—

1st, That this Company never promised to complete the works early in 1888, but that the earliest date named by the Company was June 1st, 1888, provided the City accepted a certain proposition then before it, which was not done.

2nd, That the earliest date named without any consideration being given by the City, was 18 months after the confirmation of a By-Law by the ratepayers (per proposition of March 14th, 1887), thus bringing the date of completion up to January, 1889.

3rd, That the sum of \$10,000 was deposited on June 3rd, 1887, in the Bank of British Columbia, Vancouver, in the name of trustees, as a guarantee for the completion of the water system by June 1st, 1888, subject to certain considerations referred to in a letter accompanying the deposit, but subject also to unavoidable contingencies, which sum was returned to the Company seven months afterwards, not because the Company had failed to comply with any of the conditions, but because the City did not accept the Company's proposition.

That the Directors, since they have taken in hand the active construction of the works, have not allowed any delay to arise which it was in their power to avoid, and they regret, perhaps more than the citizens of Vancouver, that the time originally fixed for the completion of the work has been slightly exceeded.

That the Council must be aware of the difficulties which have had to be overcome through the failure of the contractor for laying the submerged main in accordance with the contract, which caused a delay of at least three months, but this delay made the remainder of the work to be completed at a season of the year when it has been next to impossible to do the work of pipe laying, although the Company have been pressing the contractors to expedite the work in every way possible.

That the delay has been a very great inconvenience to the Company, as well as a serious loss, and the Directors are therefore fully in accord with the Council and the citizens of Vancouver in their anxiety to push forward the completion of the water works system, and beg that with these explanations, the Council will see the reasonableness of the position claimed for the Company.

That with reference to the bond referred to in the resolution, the Company think that the fact that they have already invested in the neighborhood of \$200,000 in this undertaking, should be a sufficient guarantee of their determination to complete the work at the earliest possible date.

That with a view to a better understanding with the Mayor and Aldermen of the City of Vancouver, the directors will be glad to meet a committee of the Council personally at Vancouver at an early date to be named by the Council.

Upon the reading of the letter from the Water Works Co., Ald. Horne said it was quite a lengthy report, and contained some inaccuracies, to which, however, he would not refer. He could not see why the Water Works Co. objected to give a bond. In their letter they promised to have the Water Works in by the 1st of March, and his resolution simply asked to give a guarantee. If they meant business he did not see what objection they had to guaranteeing their intentions. He was willing to give them three times the time they asked, that is three months, if they would only be sure to do it by that time. They had been promising and promising, and he wanted them to do something. He said that the Company had been taking notice of his resolution in more ways than one, by fixing up the crossings, etc., and therefore the resolution had done no harm.

ALDERMAN HORNE acted wisely at the City Council last evening in not bringing forward the motion of which he gave notice last week for the City to take steps to construct and operate a system of water works. By his withdrawal from the position he had previously taken up, Alderman Horne has shown that he has the courage to admit an error and he will find that his influence among his constituents will not be weakened but rather strengthened by this display of common sense, a quality not too common among civic as well as other legislators. But we think the worthy Alderman should have gone a step further and have completed his withdrawal from a position, really untenable, by dropping any further allusion to the question of demanding a bond from the Vancouver Water Works Company. Alderman Horne appears to forget the fact that the City has hitherto practically ignored the Company's proposals, and that when the latter did offer to give a bond to carry out certain work within a specified time, the City by its silence really declined the Company's offer. Notwithstanding this the Company went on in good faith, and has substantially completed the work without any real recognition by the City, and without the latter pledging itself to give the enterprise the support it might have expected.

Now Alderman Horne comes forward and in a Dick Turpin style holds a bond at the Company and says that it must either sign that or it will be the worse for it. Does not the worthy alderman see that he lays the City open to have a reply given to it by the Company which, while it can do the former no good, may show that the Company thinks it should demand some consideration for the obligation it is asked to undertake? And suppose that the City should not see its way to accede to the terms proposed, would not this unnecessary action in demanding a bond, place the City in an embarrassing position, or at least one from which it could not withdraw without some injury to the aldermanic dignity which is so dear to all of us? True, the Council might get piqued and say it would build works of its own. But then the taxpayers would be called upon to take a hand in the game, and between them and the Company it is probable that the Council would have a decidedly *mauvais quart d'heure*. When the committee of the Council meets the directors of the Company let any mention of the bond be omitted. The Company is using every effort to supply the City with water at the earliest possible time; it can earn no return on its investment till this is done. Being therefore assured that the interests of the City and the Company are identical, there should be nothing done by the Council to cause any friction which might delay even for a day the consummation desired by both the City and the Company.

VANCOUVER'S AND CANADA'S ENGINEERS.

Though young in years and comparatively small, Vancouver seems to be coming to the front tolerably well in everything in the Dominion. It would scarcely have been supposed in a gathering like that which assembled recently in Montreal, when the annual meeting of the Canadian Society of Civil Engineers was held, that the Queen City of the Dominion would, through some of its citizens have been conspicuously mentioned in the course of the proceedings. Yet in the report of the meeting which appears in the Montreal Gazette, the names of no less than three well known gentlemen of this city appear: Mr. H. B. Smith (resident engineer of the Vancouver Water Works Co.) who was appointed a member of the Nominating Committee for 1889; Mr. E. Mohan, who contributed a paper to the Society on the Sewerage system of Vancouver, and Mr. G. A. Keefer (Chief Engineer of the Vancouver Water Works Co.) who was elected to be a Member of the Council. If Vancouver has been able thus easily to connect itself so conspicuously with this important society, is it not reasonable to ask if the Society should not hold its annual meeting here in 1891?

Instantaneous Death.

Yesterday morning an unfortunate occurrence took place, which resulted in the instantaneous death of a man named Keller, in the employ of the Water Works Co. The deceased and others held a contract for piece work from the Water Works Co., for laying pipes on the other side of the Narrows. Sunday being a fine day and it being desirable to push the work on account of delays caused owing to several rainy days in the past few weeks, Keller and his comrades went out to work so as to take advantage of the good weather, and in the course of the morning a blast was set off in the usual manner. It would seem, from the information at present at hand, that the deceased was running away from the spot where the blast was being set off, but had not got away far enough when it went off. A good sized stone flew and hit Keller on the skull, smashing it to pieces, his brains being scattered in all directions. There can be no doubt but that the poor fellow's death was instantaneous. Coroner McGuigan and the police were immediately notified of the accident, and the body has since been placed in the morgue ready for the inquest to be held this afternoon.

Coroners Inquest.

This afternoon, commencing at 2 o'clock p. m., Coroner McGuigan held an inquest at the City Hall, on the death of Daniel Keller, killed by a stump from a blast yesterday in the forenoon.

The following jury was sworn in:—M. R. Barry, (foreman), R. Rutherford, W. G. Nase, F. Crosby, Duncan Buchanan, J. B. Stewart and Alfred Bunker.

After a few words from the Coroner as to the nature of the inquest an adjournment was made to the morgue for the jury to view the body. The upper portion of the skull was entirely gone, showing evidence of having been literally torn away. The remainder of the inquest was then continued at the hospital.

John Findlay, one of the men working at the Capilano Creek laying pipes on Sunday morning, was sworn and stated, that he and the others were at least 200 feet away when the blast went off. Deceased was in the act of going still further away, but was in the open. He did not see the deceased struck, but saw him afterwards lying dead. None of them were forced to work on Sunday. All who worked did so voluntarily.

Michael Hopkins, L. W. Hodge and E. W. Bradshaw each gave corroborative evidence; it being shown conclusively that due warning was given before the blast was set off. Deceased evidently saw the piece of stump coming and tried to dodge it, but did not move away quickly enough. Death must have been instantaneous.

After due deliberation the jury brought in the following verdict: "We, the jury, say that the deceased came to his death by accident, and that no one is to blame in the matter."

The remains of the deceased will be interred at the city cemetery to-morrow.

The Directors of the Water Works Co. will have a meeting with the committee of Aldermen, especially appointed to meet them, on the 12th inst., when the subject will be thoroughly discussed.

The men laying water mains have got all the way up Hastings Street from Westminster Avenue as far as Richard Street. A few days more and the mains will be laid on Granville Street.

The Water Works.

The late agitation in connection with the Water Works appears to have been productive of good. It is reported that there are now several hundred men at work on laying, pipe-laying, etc. It is believed that water will be served in the city early in March. Ald. Horne's action has been productive of much good, as no idle men are now to be encountered in the city. Every one willing to work can get employment.

THE WATER WORKS.

TO THE EDITOR:—In your issue of yesterday evening a paragraph appears, the evident intention of which is to reflect on the energy of the Water Works Company, in prosecuting the works to a speedy conclusion. The paragraph states that the agitation in connection with the water works and Ald. Horne's action have been productive of much good. I beg leave to give this statement a most unqualified denial. Ald. Horne's motion, in the Council meeting of the 21st ultimo, is remarkable for its inaccuracies, and on that account presents features of interest to the citizens of Vancouver, which in the future no doubt will render it historical; but it has had no effect whatever on the energetic prosecution of the works of the Vancouver Water Works Company, or in the employment of idle men. No work is now being done that was not arranged for long before Mr. Horne was elected to a seat in the Council; and had the Company never heard of his motion, the busy works now going on would have commenced just when they did and not a day later.—Your obedient servant,

HENRY B. SMITH,
Engineer in Charge.

Vancouver, February 9th.

—At present the work of constructing the Vancouver Water Works is being pushed forward with great vigor. It is expected that, should fair weather set in, water will be let into the mains in about two weeks' time.

—The directors of the City of Vancouver Building Society, which has just been organized, consists of W. G. Alcock, W. H. Gallagher, M. Tilley, D. Munro and George Barnes. The shares taken up, aggregated in yesterday's issue, already amount to 170.

THE WATERWORKS.

A Promise Made that the Sparkling Fluid Will be Brought in by April 1st.

The meeting of the committee of the council and the directors of the Vancouver Waterworks Company, held yesterday afternoon in the City Hall, was more protracted than was at first expected.

There were present on behalf of the Waterworks Company John Irving, president, and Messrs. R. P. Rithet, D. M. Eberts, T. Earle, G. A. Keefer and J. W. McFarland.

On behalf of the Council there were present His Worship, Mayor Oppenheimer, City Solicitor Blake and Alds. Horne Whetham and Clarke.

Ald. Horne took the chair and opened the meeting. He said, addressing the President and Directors of the Company. I presume you all know the purpose for which this meeting has been called, to take into consideration the all-important question of supplying the City of Vancouver with water for both domestic and public purposes at the earliest possible day. I must say, Mr. President, that we have been disappointed by the delays which have already occurred, and I beg to call your attention to the following card issued by your own company:

VANCOUVER, May 25th, 1887.

To the Electors of the City of Vancouver:—

GENTLEMEN:—I am authorized by the Vancouver Water Works Company to make the following statements:

1st. That this company is prepared to supply the city with water from Capilano Creek without any guarantee of interest on their stock or bonds.

2nd. That they will furnish the water within one year from June 1st.

3rd. That they will supply the city with water for fire purposes and place hydrants where directed along their line of pipes, for which a charge of \$25 for each and every hydrant per annum will be made. Said \$25 to cover use of water and hydrant for fire purposes of the above.

4th. If the By-Law is defeated and the City Council prefers it, our company will supply the city with water as per its proposal of March 14th, 1887, with no variation therefrom except as to time limit which shall mean that works are to be completed within one year from June 1st.

5th. That they are prepared to give a bond if required for the due performance of the above.

THE VANCOUVER WATER WORKS CO., (L.D.)
Per J. W. McFARLAND,
Secretary.

Now, gentlemen, I claim that you have not kept to your promise by either bringing the water into the city within a year, viz 1st June, 1888, nor have you given the city any bond. You claim to have put up \$10,000 in the hands of Trustees as a security, provided that the city would enter into a certain contract with you, which they were not in a position to do at the time; and even if they were, they did not consider it for the best interests of the city to do so. This is why I introduced my resolution at the Council board on the 21st of January, and I say that said resolution is correct according to your card which, dated 25th May, 1887, I have just read, and I would ask you now to set a definite time when you will have the water brought into the city, and to give the Council the guarantee bond you promised.

Mr. Eberts opened the ball for the Water Works Company and said that the by-laws had not passed at the time the first proposition was made by the company.

City Solicitor Blake said that the bylaw was voted on in June so that it must have passed the Council at the time the proposition was made.

This Mr. Eberts doubted.

Mr. John Irving, with great emphasis read the proposition of the 14th of March, 1887, and followed it up with remarks relative to the propositions made by the company, dated the 25th of May, 1887, and subsequently the 4th of June. He dwelt for some time on the clause relating to the bond for \$10,000, which was placed in the hands of J. C. Keith, manager of the Bank of B. C. here, and was subsequently withdrawn. This bond remained in the hands of the Trustees for about 7 months. The company had already expended \$135,000. The directors, he said, had been informed, since their arrival here, that the work across the narrows, would be completed within 15 to 30 days.

After the matter of the propositions of the company had been fully thrashed out, his Worship the Mayor said the subject of the bond of \$10,000 should not have been placed in the hands of Trustees, as it placed the city of Vancouver in such a position that they could not deal with it.

Ald. Horne said that it appeared very like "bluff" to put the matter in the hands of trustees.

The Mayor—It should have been placed in the City's hands, then they could have dealt with it.

Mr. Irving said the three trustees appointed had been selected by a number of citizens. He did not see why a guarantee bond was asked for at this late date.

DINED AND WINED.

The Water Works Directors Entertained a Number of Guests Last Evening

For an impromptu affair the dinner at Hotel Vancouver was one of the most pleasant ever held in the city. Those directors of the water works, Capt. John Irving, President; R. P. Rithet, T. Earle and D. M. Eberts, who came over from Victoria to hold a conference with a special committee of the council selected for that purpose, at the conclusion of the interview invited those present to a "feast of reason and flow of soul." Subsequently a few others were invited, those comprising the company being the gentlemen named and His Worship the Mayor, Aldermen Salsbury, Whetham, Horne, Clark, Brewer and Lefevre, City Solicitor Blake, City Clerk McGuigan, G. A. Keefer, H. B. Smith, D. McGillivray and J. M. O'Brien. The dinner was held in one of the private dining rooms and was acknowledged to have been one of the best ever produced in this city reflecting great credit on the hotel management, and the staff generally. The chef had evidently laid himself out for the occasion. When the good things of life had disappeared Capt. Irving, who presided, proposed the health of "The Queen" which was honored in the usual way.

The "Mayor and Aldermen" was the next, Capt. Irving proposing it in a neat little speech.

Mayor Oppenheimer replied, and said that while the company were not bound to bring water in before the 1st of April, he hoped the pleasant discussion that had taken place would induce them to give Vancouver a good supply by the 5th of March, when the Board of Trade propose giving their first annual dinner. Sparkling water, plenty of it, would be required on that occasion.

Ald. Horne was called for. He felt that the city's progress depended largely on a good water supply. It was needed, not only for domestic purposes, but for manufacturing uses, fire and in other ways. The people had expected it long ago, and had been disappointed, but the company were not to be censured. Many unforeseen difficulties had cropped up, and Mr. Rithet's explanation had put the matter in an entirely different light. From what he had heard to-day he believed the company desired to get water in as soon as possible. Notwithstanding, the company might have had water in long ere this. No doubt but that the unfortunate contract with Ward affected them, and there was a delay with the pipes; but now he hoped the promise made would be kept. He trusted the citizens would not be again disappointed, and hoped there would be no more "humbucking." He claimed that his resolution was correct according to the circular issued by the company. He hoped the water would be in by the 1st March.

Mr. Rithet—The 1st April.

Ald. Horne, in conclusion, trusted the promises made would be carried out.

Mr. Rithet—D.V.

Ald. Salsbury was glad the matter had ended so pleasantly, and thanked the directors for their kind hospitality.

Ald. Whetham was gratified at being present. He believed the directors meant to do what was right, and that they would carry out their promises. He was pleased to see such representative Victorians here. He criticized the conduct of some who say there is rivalry between the cities of Vancouver and Victoria. None such exists. The interests of the Province are paramount. Both cities have room to grow, and many more. He trusted that sectionalism would cease. The building up of this beautiful land—the gem of the Dominion—should be the aim of all, and he looked forward to seeing it one of the richest possessions of the Crown.

Ald. Clark had found the doings of the company all that he had desired. Taking into account the difficulties on the north side of the Inlet, he was not at all astonished that delays had occurred. He did not think water would be in by March 1st, but by the 1st of April without doubt. Who are the men backing up the enterprise? From his connection with them—and it had been a long one—he knew them to be thorough gentlemen and he felt that if it is in their power the work will be completed and the water turned on by the 5th of March.

Ald. Brewer was pleased to see the amount of success achieved by the company. He always had faith in Capilano as against Coquitlam, and the results had borne him out.

Ald. Lefevre said that nobody would be more pleased than himself to see good drinking water in the city. It is a want badly needed. In a sanitary sense, too, it is a necessity. He only hoped the company would fulfil their promise to get water in by the 1st of April.

The health of the President and Directors of the Vancouver Water Works Company was then toasted by His Worship the Mayor.

Captain Irving was glad to meet the Vancouver gentlemen in such a social manner. There had been a few hard words and a few hard knocks. It was thought by some that the company had not moved fast enough, but it had done all in its power. The material had been ordered before the election took place, and had it not been for doing so then the delay might have been longer. As soon as the work on the north side is finished that on the south will be as well, and he believed good water would be in Vancouver inside of 30 days.

Mr. Rithet felt that the little explanation made had put all things right and the directors consider everything now satisfactory. The corporation had never complained to the Board, nor had it expressed its dissatisfaction to them. He trusted in the future they would go to the fountain head and in that event they would probably see matters in a clearer light. Vancouver ought to be proud of its enterprising aldermen and he was glad to notice the push which characterized them. It had been said Vancouver was in the hands of the company. He could say that the company was just as much in the power of the city. He believed that water would be brought into the city before April 1st, provided no physical difficulties were in the way. By the 5th of March he hoped to see cold water thrown on the terminal city as an occasion will then arise when it will be very much needed. He believed the result was mutually satisfactory, and that if any jealousy had existed between the two cities, it would now be lessened and finally stamped out altogether.

Mr. Earle had no doubt the company would fulfil its promise as soon as possible. Water would be in by the first of April anyway, and he hoped by the 5th of March.

After some remarks by Ald. Brewer, Mr. Eberts, a director as well as solicitor of the company, made a lengthy speech dilating on the entire scheme from its inception. Mr. George A. Keefer being the first to broach the subject, long before there was any idea that Vancouver would become the city it is today. He had seen all the streams and concluded that Capilano was the best of all. Though many said the Capilano system would be a failure, he, being a man of wide scientific knowledge, had claimed otherwise, and now he was enjoying the fruit of his labors. He hoped any further difficulties would be settled in the same friendly way.

Mr. Keefer's health was then toasted, and he said the matter had been one of professional pride to him, and the water works would be speedily carried out to completion.

Mr. McFarland's name was honored, and he stated he always had confidence in the scheme and he was glad it had turned out so well. It was stated that the distribution was four miles, he could say it was ten. The crossings would be fixed all right, and the city would have no reason to find fault after the work was completed.

Mr. McGillivray bowed his acknowledgments to the toast of his health.

After Mr. O'Brien had spoken to the toast of The Press at some length, the health of the City Solicitor and other City Officials was toasted. Mr. J. J. Blake and Mr. T. F. McGuigan replied, acknowledging the honor done them.

The health of Mr. H. B. Smith, engineer in charge, was then drank, and after Ald. Lang Syne had been sung the pleasant evening came to an end.

Mr. Rithet followed up the remarks of Mr. Irving by stating that he considered the Council should be saddled with the responsibility of definite arrangements not being made in the first instance, as it had let the matter drift. Mr. Rithet then gave a clear, concise history of the trouble which had been experienced from the commencement in getting materials here from England, especially the pipes, giving the dates of the shipments made, the causes of delay and the throwing up of his contract by J. F. Ward. Delays which were in no way expected had occurred and could not be avoided and certainly were not the fault of the company. He laid stress on the indifference of the Council, and was convinced that to press the company for a guarantee was unfair and an unnecessary proceeding. He hoped the Council would give the company the opportunity to complete the work without asking for a guarantee.

After a few remarks from Mr. Eberts, Ald. Whetham briefly pointed out the inconvenience the citizens were placed in by the water not being brought in.

Then followed some good-natured discussion relative to the non-receipt of the water resulting in Ald. Horne asking for a settlement for the water to be in the city, stating that the committee would be glad to extend the time from the 1st of March a little.

The Mayor said he did not see why a definite date could not be decided upon.

Ald. Horne said he did not see why a guaranteed date and bond should not be given.

Mr. Rithet—We do not see why we should give it.

Mr. Earle here explained that the system as it is already completed, is more extensive than that which was at first contemplated.

Ald. Whetham asked if it was the intention of the company to build a reservoir on this side of the Narrows, and also lay another line of pipes under the water.

Mr. Irving and Mr. Rithet both said that the company had these under contemplation as soon as the present system is completed.

Ald. Clark said that as the company decline to give a guarantee bond, and as the Council cannot compel them to give a bond, that he would suggest that the secretary of the company write to the Council to the effect that they expect without doubt to have water in here by the 1st of April.

The directors stated that they would be willing to instruct the secretary to write an official letter to this effect. It was eventually considered that an official letter would be unnecessary, and that the chairman could embody the date in his report.

A discussion led to the 1st of April being decided on for the day by which the company are to have water in the city. The subject of the rates to be charged by the company was then discussed at great length.

Mayor Oppenheimer was of the opinion that many of the small items specified in the schedule of rates drawn up by the company might be lumped under general heads.

The sliding scale of charges to be made also came under discussion. It was maintained by the company that the rates as specified are less than those charged in San Francisco, Portland, Victoria and other cities. The system of charges is the best in force. The rates, they considered, could not be looked upon as excessive. It was finally decided that the secretary to the water works furnish the Council with a full list of rates.

Ald. Horne then brought up the subject of the dirt being left at the side of the streets after the pipes had been laid, and stated that the box drains had been damaged in many instances. He said the city would require that the whole of the work be cleaned up thoroughly and satisfactorily, and the drains fixed.

The directors, their engineer and the secretary said they would be only too glad to attend to all reasonable requests of that kind.

In reference to the hydrant on Jackson Avenue, to which THE WORLD has repeatedly referred, Secretary McFarland said that it had been put down on the lines given by the City Engineer, and would be remedied just as soon as the true line of the street was settled upon.

The subject of the size of pipes being used was then discussed in an informal kind of way, after which the meeting adjourned.

THE result of the conference on Tuesday between a committee of the City Council and the Directors of the Water Works Company appears to have been satisfactory as regards satisfying the most sceptical alderman that within a very short space of time the City of Vancouver will be furnished with an excellent supply of the purest water from the Capilano River on the north side of the Inlet. Should the weather continue as favorable as it is at present for the prosecution of the work of laying the main in the canyon of the river, it is not impossible that water may be obtainable by March 5th. But in any case the Water Works Company pledges itself that before the end of that month, it will be in a position to supply the citizens with water. No circumstance connected with the progress of Vancouver can be of more general importance than the completion of the water works. The only thing to which a stranger might take exception hitherto in the general arrangements for health and comfort in the City has been the lack of a constant and abundant supply of good water and it is, therefore, most satisfactory to know that the time when this deficiency will be remedied can be calculated by days. With a good water supply and an addition to the present system of sewerage and Vancouver will compare most favorably as regards its sanitary arrangements with any city on the continent.

As there appears, therefore, no reason to doubt the completion of the works at an early date, and as the citizens in every part of the city will be anxious to avail themselves of the supply as soon after the water is turned into the mains as possible, we would suggest the advisability of persons making arrangements for connecting their houses with the water mains without delay. There will be a general rush to get this work done and if all delay attending to the matter until the works are actually in operation and water from the Capilano River is being delivered in the City, there will be much disappointment experienced by many at the delay which will inevitably take place in getting the work done necessary as a preliminary condition to a house service. After the explicit statements of the Directors of the Company on Tuesday, no one can doubt the early completion of the works, and we think that an immediate attention to the matter we have suggested will tend to the convenience and comfort of a large number of the citizens.

THOSE LINES AGAIN.

TO THE EDITOR:—I observe Mr. McFarland stated publicly that the hydrant at the crossing of Carl Avenue and Hastings Street was placed on the lines given by the City Engineer. This statement is incorrect. Neither he nor anyone else ever asked me for the street lines there and no man in Vancouver ever asked me for street lines without getting them. The lines at the crossing of Carl Avenue and Hastings Street were placed there long before either Mr. McFarland or the Water Works Co. were known in Vancouver. He says further that as soon as the lines are determined upon he will move the hydrant to its proper place. The sidewalk on Carl Avenue has been laid on the true line for over ten months. Mr. McFarland when he again speaks should endeavour to do so strictly in accordance with the truth.

J. P. LAWSON.
Vancouver, Feb. 14, 1889.

Vancouver Water Works.

The city of Vancouver, B. C., is soon to have a high pressure water system, with a supply derived from the river Capilano, a precipitous stream taking its rise in the snow-capped mountains of the Coast Range of British Columbia.

A submerged water main, 1,100 feet in length, with flexible joints, has been laid across Burrard inlet, being part of the main line of the Vancouver water works.

The manner of laying and appliances were somewhat novel. A skidway of fir logs was built in a trench on the shore, reaching 1,200 feet back from the water's edge. The whole line of 1,100 feet was then made up on the skidway with the Ward flexible sockets. Three cables were then attached, one at each end and one at the middle, the forward and middle cables being carried across the stream and attached to the drums of separate engines. The cable from the rear end was attached to an engine drum at the water's edge, on the same side of the stream, and floats were provided for partially buoying the pipe, and lashed to it as it entered the water.

The weight of the whole length of pipe, including lead joints, was 55½ tons; the three engines having an aggregate of 180 horse power. With this arrangement the pipe was drawn steadily and safely to its place without accident, and was examined for its whole length by a diver, who cut the buoys loose. The pipe was tested and accepted by the city.

The successful accomplishment of this work is due to the local contractors of the water works, Messrs. Keefer & McGillivray, under the advisement of the resident engineer of the water works, Mr. Henry B. Smith, C.E.

The Water Works.

E. W. Bradshaw came over from Capilano yesterday and announces that all the pipe has been laid between the Inlet and the dam, and that the water has been running through the pipes. There are only now a few lengths of pipe to be laid at lowest tide water. The citizens of Vancouver may expect to have the Capilano water in the city by Wednesday or Thursday next at the furthest.

WATER IN THE CITY.

The Capilano Water Works Co. Turn on the Water—The Narrows Crossed Last Night and the Mains in the City Filled.

The work of two years has been consummated and, after many delays; not a few disappointments and the accomplishment of a difficult engineering feat, water from the water works dam of the Capilano River, ten miles from the place of writing in this city, crossed the Narrows last night at 11.10 o'clock, at 1 o'clock had filled the mains on Georgia street and at 2 o'clock had reached Westminster Avenue. Since Friday morning last the contractors, Messrs. Keefer & McGillivray, have been testing the various sections from the dam to the Narrows and it was only last evening that water was headed across the Narrows for the city mains. Although everything was in a state of readiness on Friday, it was thought best to test thoroughly every point. As in every undertaking of the kind, where the success of the whole depended upon the perfectness of every detail, there were a few slight delays, but from start to finish, after a thorough and careful test of every part, it was pronounced by the engineers in charge to have been successfully completed.

So much has already appeared in these columns concerning the Capilano water works scheme that it would be wholly unnecessary to repeat here. In the New Year's special number of the NEWS-ADVERTISER there was a very minute and exhaustive description; also at the inception of the project, that completed marks a distinct era in the history of the city and places Vancouver in the van of Provincial and Dominion cities for enter-

prise. Probably the Terminal City can now boast of not only the best system of water works, but of the purest and finest water supply in Canada.

On Friday a representative of the NEWS-ADVERTISER accompanied the secretary of the Water Works Co., Mr. J. W. McFarland; Mr. W. F. Bullen, manager of the Albion Iron Works, Victoria; Messrs. Geo. Keefer, C.E., chief engineer, H. B. Smith, C.E., resident engineer, and Messrs. McGillivray and Hugh Keefer, the contractors, all of whom are to be congratulated upon the final and successful termination of the enterprise—to the Narrows and up the Capilano Valley, following the course of the main to the dam, 6½ miles from that point. He obtained from that trip a very good idea of the difficulties which had to be overcome in first crossing the Narrows, the success of which was questioned from the outset, and then following up the Capilano Valley, here crossing the river bed, there climbing steep hills, bridging over gullies, tunnelling through solid rock, and overcoming every kind of obstacle to reach the dam constructed of heavy masonry work. Another factor that must not be overlooked, is the fact that as a preliminary to the work about \$6,000 had to be expended in constructing a tramway through an unbroken forest in order to convey the pipes, supplies, etc., to the various working points along the line. In many places these had to be hauled up steep grades by means of cable and let down in other places by the same means. A visit to the scene of action and a trip up the Capilano will convince any fault-finding citizen of the unjustness of criticisms on the work of the Company they may indulge in. Such a visit will be amply repaid in itself by the scenery afforded.

At exactly ten minutes past eleven o'clock last night the water from Capilano River through the mains of the Vancouver Water Works Company under the Narrows reached Coal Harbor and at two o'clock this morning it had penetrated the City mains as far as Westminster Avenue. Vancouver, therefore, to-day is in possession of a water supply, unsurpassed in both purity and abundance by that of any other city on the continent. Those of the citizens who have resided here for the past two years or more, are well acquainted with the difficulties which have intervened in the prosecution of this work, so important to the comfort and safety of the people, and, indeed, indispensable if Vancouver is to maintain the reputation which it has possessed in the past of being one of the healthiest cities in the Dominion. To those who have been personally interested in the undertaking, who have invested their capital in it, whether citizens of Vancouver or Victoria, the people of the Empire City will extend their warmest congratulations on the successful completion of their enterprise, while to the engineers and contractors who respectively designed, superintended and carried out the scheme, the success of to-day will be an ample reward for the difficulties and obstacles of every kind which have from time to time arisen—sometimes very unexpectedly—only to be overcome by the indomitable energy and perseverance of those who had charge of the undertaking. Our readers are well aware of the consistent support we have extended to the enterprise from its inception and to-day our faith and labors are abundantly satisfied in the fact that

finis opus coronat.

Coquitlam Water Works Agreement.

The following is an exact copy of the agreement between the city and the Coquitlam Water Works Company, as passed by the city council on Monday night last, and will prove interesting to a majority of our readers:

ARTICLES OF AGREEMENT made this day of — one thousand eight hundred and eighty-nine.

Between The Coquitlam Water Works Company (Limited), having offices in the Masonic Block in the City of New Westminster, hereinafter called the company of the one part,

And the corporation of the City of New Westminster, hereinafter called the corporation of the other part.

It is hereby agreed by and between the said parties hereto as follows:

1. The company shall grant, sell and make over to, and the corporation shall purchase and receive, such and so much of all the rights, title, powers and interest which the said company has or hereafter may obtain, to construct, manage and maintain water works, to supply the City of New Westminster within the limits now defined, or as they may hereinafter at any time be extended by any future addition or additions which may be made to the said city, and of all the powers and easements in relation to the said water works, to supply the said city conferred on the said company by the act incorporating the said company, and entitled an act to incorporate "The Coquitlam Water Works Company (Limited)," as may be necessary so far as the said city only is concerned, for the sum of \$20,000 of lawful money of the Dominion of Canada, payable at the end of sixty days from and after the passing and ratification of the by-law hereinafter mentioned.

2. The said company further agree with the said corporation that they, the said company, shall obtain and grant to the said corporation the right-of-way over the pipe track as at present located for the main pipes, ditch, or flume necessary for the construction of the said water works from the Coquitlam River and the lake to the said city, and they, the said company, hereby agree with the said corporation to purchase, buy, or otherwise obtain all lands, easements, and rights-of-way necessary to be bought or otherwise obtained for the purpose of laying and erecting the said main pipes, ditches, or flumes between the said city and the said lake and river, and from time to time, and at all times, hereinafter to permit, allow and secure to the said corporation, their agents and workmen, the right to enter upon the said lands, and to use the said easements and rights-of-way so obtained or purchased as aforesaid, it being the true intent and meaning of this agreement that the said corporation shall have the said right-of-way and the permission to enter upon and use the lands and easements appertaining thereto, so far as is necessary for supplying the said city with water, free of all expense, granted to and provided for the said corporation by the said company as part of the premises agreed to be purchased by the said corporation from the said company for the said sum of \$20,000. Provided nevertheless that the said right-of-way and easements aforesaid shall be located and situated on, over, along and adjoining the pipe track or survey already made from the said city to the said lake and river by the said company, but within the limits of the lands already surveyed and set out as the lands required by the company, insofar as the company have already surveyed and set out, the lands they require for the purposes of their charter.

3. The said company agree with the said corporation that they, the said company, will permit and give to the said corporation the power and right to use their (the company's) name in all matters, legal and otherwise, wherein it shall be necessary for the said corporation to use the said name of the said company for the proper and more effectual carrying out of the said water works scheme, and for the purpose of obtaining or making use of the powers or franchises of the said company intended to be conveyed by this agreement, provided, however, that the said corporation guarantee, and they hereby guarantee and hold safe the said company from all law costs, damages and other expenses caused by the use of the said company's name by the said corporation as aforesaid. Provided, nevertheless, that the power of the said corporation to use the name of the said company shall continue only during the progress, and until the completion of the laying, executing, building and furnishing of the necessary works to supply the said city with the said water, as aforesaid, beyond two years from the execution of this agreement such time not to extend.

4. The said company agree to hand over and give to the said corporation the plan of alignment and profile of the said pipe track, together with all original field notes of the survey of the said pipe track, and an estimate of the costs of a system of water works between the said city and the said lake.

5. The said company, further covenant with the said corporation that, notwithstanding anything by them done, omitted or knowingly suffered, they now have good authority and power to grant the said premises hereby agreed to be granted to the said corporation as aforesaid, and that they have done no act to incur the said premises, and that they, the said company, and every company and person claiming or having any estate or interest in the said premises, through or in trust for them, will at all times, at the cost of the said corporation, requiring the same, do and execute every act, assurance and thing for the further and more perfectly carrying out of the promises and purposes of this agreement.

6. It is further agreed by and between the said company and the said corporation that this agreement shall be binding on the said corporation only after ratification thereof by the electors of the said city of New Westminster by vote on the by-law proposed to be passed by the council for the raising of funds to carry out the said work of supplying the said city with water as provided for in the New Westminster Incorporation Act, 1888. And that immediately after the said ratification aforesaid the said company shall, with all due and reasonable diligence carry out the agreements here-in entered into on their part.

OUR WATER WORKS.

A Complete Success Crowns the Enterprise—Water Now in the Mains.

A representative of THE WORLD saw some of the officials of the Water Works Co. this morning and learned from them that the water is now in all the city mains, and so far the test has been most satisfactory in every respect. Instructions have been received from the C. P. R. for all the various large blocks erected on Granville Street, besides the residences of officials and the Hotel Vancouver, to have water put into them without delay. So far the water is only being used to clean out the pipes, but will, by degrees, be passed into the service pipes and supplied to the householders who have made applications. The Waterworks system may now be considered an accomplished fact and an unqualified success in every particular. The company is to be congratulated as to the results of their hard work for the past two years. Naturally those in charge of the works, Messrs. G. A. Keefe, H. B. Smith, the engineers under whose superintendence the works were carried on by the contractors, Messrs. Keefe & McGillivray, and the persevering, painstaking secretary, Mr. J. W. McFarland, are all quite elated to-day on the result which has attended their efforts. Nor should Mr. J. J. Nickson, the energetic superintendent of construction in the city, be omitted. To him is due much praise for the admirable manner in which the work was carried on to its successful completion. He, too, like the other officials, is gratified in knowing that his labors have not been in vain.

THE WATER WORKS.

The test of the water mains of the Water Works Co. was very satisfactory, and water will be turned on in a day or two for general domestic use and fire purposes. In the meantime a number of applications are coming in from householders and others to be supplied.

Ten and a half miles of mains are laid, from the dam to Hastings street east. They are laid along Georgia, Granville and Hastings streets. There are 12 miles of distribution pipes laid along in whole or part of the following streets: Alexander, Powell, Oppenheimer, Hastings, Dupont, Keefe, Harris, Balmoral, Prior, Westminster Avenue, Carrall, Cambie, Hamilton, Homer, Richards, Seymour, Granville, Horne, Hornby, Burrard, Georgia, Pender, Cordova, Water, Davie, Drake and Princess. Their will be 60 hydrants in use. Extension, of course, will continue in various directions.

The Vancouver Water Works Company.

NOTICE.

ALL persons are strictly forbidden to tap, or in any way interfere with the mains or pipes of this Company, and any person or persons so tapping or interfering will be prosecuted under the Company's Act of Incorporation.

Intending consumers are required to make application in the forms prescribed, which will be furnished on application to the Secretary. In no case will the water be turned on until the cost of the connection is paid.

J. W. McFARLAND,

Secretary.

118 Alexander Street.
Vancouver, B. C., March 27, 1889.

THE WATER WORKS.

As there appears to be still a certain number of the citizens who seem to doubt that the Vancouver Water Works Company is even yet delivering water from its mains, it may be interesting to such persons to state that this issue of the NEWS-ADVERTISER was printed with power furnished by a motor run by water from the mains of the Water Works Company. The motor, which is of 12 horse power, was supplied by Messrs. J. Findlay & Co., of this City.

Mr. H. B. Smith, C.E., resident engineer of the Vancouver Water Works, leaves to-day eastward bound. He will visit the principal cities of Canada, and afterwards leave for England and Scotland, and will be absent about six months. After being a number of years away from his native soil and spending the interim in active and unceasing labor in his profession, he feels justified in taking a protracted holiday. Mr. Smith may visit Paris before returning.

also here refer to the attached drawing of ball joint attached in the Appendix. The regular location of the present submersible pipe, I consider to be quite a more dangerous place could not have been said, although I must admit that the shortest lining was selected for the pipe, requiring only 1/2 mile of pipe from the mouth of the Narrows, where the pipe is laid, the rent is very strong during tide half-tide. I note the current running at the rate of fully 2 miles per hour while the pipe is in the crossing, where the deep-water line is only 2,000 feet wide and from 30 to 54 feet in at low tide, the current is only running at about 1/2 mile per hour. I have marked it in the latter location, which is marked on the accompanying map (called Appendix 2) by the dotted red line P Q, the laying, fastening and rearing of a submarine pipe

Worthington meters in use and vary \$ 2.00
10 miles telephone, 6 instruments,
including new submarine cable
contracted for (present one out of
repair) \$ 1.50
Cost of city pipe system, complete,
exclusive of real estate in city \$ 95.35
Adding to this the cost of the dam
and main conduit complete 15.45

We have the total cost of works \$21.35.

The above estimates are liberal, particularly regarding the city pipe system. The cost of laying, for instance, I have estimated at an average of from 3 to 4 cents per foot of distance laid at any one time smaller, and consequently more expensive per foot in the worst case. The cost I have taken the most as I found in the city of value added to your city, as compared with the cost to the company can probably be best decided by yourselves. You know my opinion of the cast iron submerged pipe, especially in its present location and condition. The proposed 12-inch colomine ball joint pipe were properly installed would be at present, and in active operation, but in the new location indicated by the above, would be of little or no value. But with the present use of its cost, I would suggest to leave the cost out of the above list. Furthermore, the value of the 8-inch black wrought iron pipes from 3-inch down to 1-inch, which should have to be replaced by 8, 6 and 4 inch cast pipes as the city grows, and this small pipe comes practically in the neighborhood of \$9,000, is a very important factor in the valuation of the works is: How long will this present main pipe supply the city and when will the main delivery of the submerged pipes have to be duplicated? Delivering the submerged pipes to the pressure tank K, under a pressure of 45 lbs. at the Vancouver Hotel, the 16-inch pipe with a double 12-inch submarine pipe across the bay, will have a capacity of 100,000 gallons daily. The 22-inch pipe at the head water from the dam to the tunnel, has a delivering capacity of 100,000 gallons daily. The 16-inch pipe connecting the tunnel E with the pressure tank, simply acting as a

the pressure tank seems to be the level of pressure which the Water Company is willing to put on their land and submarine man and street pipes. Allowing a consumption of 60 gallons per capita for the past and future, and taking the past steady growth of population as the basis for its future increase, we would have the following table of consumption for the past and future—

Year.	Number Voters.	Estimated Population.	Daily Gallons per capita	Total Consumption.
1886	.....	600	.....	.....
1887	889	2,000	.....	.....
1888	1,036	600	60	360,000
1889	2,421	10,000	60	900,000
1890	.....	15,000	60	600,000
		Estimated.		
1891	.....	20,000	60	1,200,000
1892	.....	25,000	60	1,500,000
1893	.....	30,000	60	1,800,000
1894	.....	35,000	60	2,100,000
1895	.....	40,000	60	2,400,000

The above estimate of a possible population of 40,000 may appear exaggerated, but the increase of the last few years warrants the assumption, as well as the fact that the knowledge of your magnificent land-locks

tributary to it became dead, and the back country I should not be at all surprised to see the above figure reached or exceeded.

I think that Vancouver will become a great place for our kind of manufacturing, all of which will assist in increasing the demand for water.

If the consumption should increase at the above rate, you will see that in the year 1881 the works will be able to provide for the same or a similar rate of increase, should it continue during the following decade, and you will see that it would be folly to only duplicate the present supply, and that it would be preferable to build at once lay a 24-inch line from the Capilano dam into Vancouver, crossing the bay with three first-class heavy 16-inch galvanized steel ball-joint pipes. This pipe line, assisted at the dam by a 24-inch, would land 8,000,000 gallons of water daily at a head arriving here with a pressure of 250 feet above tide. This pressure with an enlarged city pipe system of circulation, and with a number of properly constructed fire engines, and first class smooth rubber hose, would allow the Fire Department to put out any fire that might occur without the aid of fire engines.

As Capilano is a city, you should also be concerned near the city, if possible at an elevation of about 250 feet.

The above developments of the possible future growth of the demand for water, requiring large expenditures of money for the next few years, may be another factor for you in arriving at the intrinsic value of the present works.

Although I am satisfied that submarine pipe is the most reasonable and protected as to the choice of supplying a city, to take the water either through a submarine or a land line

pipes, I would prefer the latter owing to its greater safety and security of insertion and its ease of repair, especially if the quality and quantity of the water and the pressure at which it was delivered and the cost were the same. In fact, the cost of the latter which has been largely borne with lead pipes as well as submerging the same, with the other above conditions being equal, *I would always give the lead line the preference over the submerging pipe, even if the former would cost from 50 to 100 per cent more than the latter.*

In conclusion I wish to say that during my investigations of the water question in Vancouver, I have been shown very kind attention at all times by the various departments of the City of Vancouver, the Water Company, and have had particularly a great deal of help from the Superintendent. I also want to thank His Worship the Mayor, the City Clerk and Chief of Police, the Committee and the Board of the Water Company, and the Government for their kind assistance rendered to me.

In the hope that the above report may prove satisfactory and assist you, in solving the water problem for your city.

I am, Sir,
Most respectfully, yours,
J. HEIKMAN SCHULTEFAR
Chief Engineer, City of W. San Francisco
Vancouver, B. C., May 21st, 1890.

P.S.—The gallons referred to in the above report are the American gallons of 231 cubic inches or 7.48 of each cubic foot.

MEMORANDUM.

In the winter of 1884, eighteen months previous to the incorporation of the City of Vancouver, the subject of a water supply for the locality on which this city has been built, was first taken into consideration by Mr. G. A. Keefer, M. Inst. C. E. This gentleman having made a preliminary examination of the vicinity, associated himself with others, who, on the assembly of the local Legislature of British Columbia, early in 1885, made application for a charter empowering them to construct and operate a system of waterworks having an initial point on the River Capilano, north of Burrard Inlet, and conveying a water supply to the inhabitants of certain specified districts on the south side of Burrard Inlet, which districts are now embraced within the boundaries of the City of Vancouver.

Owing to the limited time at Mr. Keefer's disposal, prior to the assembly of the House, the six weeks' statutory notice of application was not fully complied with. It was, however, hoped that, under the circumstances in this case, the House would suspend its rules, and allow the bill to be presented for discussion. This had been done in several previous instances. However, the House did not meet the wishes of the promoters, and, in consequence, no charter was obtained at that session.

This gave Mr. Keefer an opportunity, of which he availed himself, of making a more thorough examination of the locality of the proposed works, and of thus being in a position to present a perfected scheme to the Legislature, in its next session, in 1886.

He made a personal investigation of all the lakes and streams in the vicinity, and satisfactorily assured himself at the source of supply, as originally selected, viz: The River Capilano could not be improved on. Having definitely decided this important point, he placed, in December, 1885, fully equipped party in the field, which, under his immediate supervision, made careful instrumental surveys, the results of which amply demonstrated his previous conclusions.

Having decided on utilizing the waters of the Capilano, for the supply of the city which he foresaw must speedily occupy the districts embraced in his proposed charter, Mr. Keefer experienced no difficulty in securing the co-operation of several gentlemen, who were quite in accord with him in his opinion as to the superiority of the Capilano over any of the other and more distant streams in the neighborhood, and in the conviction that an immediate outlay for an efficient system of waterworks would not only be a remunerative investment, but also a boon to the population which must soon arrive on the scene, and who would otherwise be dependent on contaminated wells for one of the vital necessities of life.

Early in 1886 the Canadian Pacific Railway Company determined to extend their main line from Port Moody westward to the Granville Townsite at the mouth of Burrard Inlet, and decided on giving to that locality the name of The City of Vancouver."

On the re-assembly of the Legislature in February, 1886, second application was made by Mr. Keefer and his associates for an Act of Incorporation under the name and style The Vancouver Waterworks Company. All parliamentary conditions having on this occasion been duly complied with, an Act was granted, bearing date April 6th, 1886. An Act was also granted on the same day to another Waterworks Company, known as the Coquitlam Waterworks Company, and proposing to furnish the cities of Port Moody, New Westminster, and other localities, including the site of Vancouver City with a water supply from Coquitlam Lake or river.

The Act of Incorporation of the inhabitants of the Granville Townsite and adjacent lots, under the name and style of the City of Vancouver, was also granted in the same session of the Legislature.

Both water companies were limited to a period of four years, in which to construct and put in operation their proposed systems. And their charters were similar in most particulars except in one point of most vital interest to the people of Vancouver.

In the charter of the Vancouver Waterworks Co., the House inserted a clause (No. 35.) conferring on the City of Vancouver the right to acquire the company's works by purchase, on giving 12 months' notice in writing. But no such clause exists in the charter of the Coquitlam company.

In June, 1886, soon after the Vancouver Co. had obtained its charter, the first steps towards construction of their works was commenced by that Company. Instrumental survey parties were sent to the field and data for the definite location of the line of mains obtained. Plans were at once drawn out, structures designed, and the general details of the whole system elaborated.

In January, 1887, an invitation was extended to the Vancouver Waterworks Co. by the City authorities to appear before the City Council and explain the merits of their proposed water supply. This invitation was issued in consequence of the action of the Coquitlam Co., who, taking advantage of the wide scope of their charter, had entered the field as a rival to the Vancouver Co., and had petitioned the city authorities for a guarantee of interest on their issue of bonds, to enable them to commence surveys and construction.

Up to this date, the Directors of the Vancouver Co. had never conceived the idea of seeking pecuniary aid from the city. Seeing, however, that such a project was entertained by the Coquitlam Waterworks Co., the Vancouver Waterworks Company decided to make a somewhat similar application.

Accordingly, in response to the invitation, their representatives appeared before the standing committee, and explained the merits and details of the proposed works, and requested the city to guarantee for ten years three per cent. interest on the amount of capital to be invested, which amount was not to exceed \$300,000. The rival company also appeared, and, among other requests, solicited six per cent. interest for a period of twenty years on their issue of bonds, up to the amount of \$500,000 00.

Neither of these propositions being accepted at that meeting, second propositions were made on January 21st, that of the Vancouver company being practically the same, viz., a request for 3 per cent. interest guaranteed for ten years on an amount not to exceed \$300,000, and to commence only on completion of the works, water for fire purposes being offered free, provided the Corporation furnished the necessary hydrants.

The Coquitlam company, however, materially altered their first proposition. On this occasion they requested a 4½ per cent. interest guarantee for twenty years on \$350,000, the guarantee to commence previous to construction, the date of commencement being left undefined. They offered water for fire purposes free, provided the right of levying a rate on all insurable property was conferred on them. The Council deferred action in the matter until both companies laid before them printed propositions, embodying their requests and conditions.

On the appearance of the printed proposals, that of the Vancouver Co., remained unchanged. A further drop, had, however, occurred in the requests of the Coquitlam Company. They now asked for a 4 per cent. interest guarantee on \$350,000.00, the interest for the first year, while their works were under construction, to be paid by the company.

On the 29th of January, the two proposals having been under due deliberation, the Fire, Water and Light Committee reported to the Council, that they unanimously re-

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garded the financial proposal of the Vancouver Water Works Company as being preferable to that of the Coquitlam Water Works Company.

At the ensuing meeting of the Council on January 31st, the solicitor of the Coquitlam Company requested the Corporation to defer action in the matter of water supply for one week, inasmuch as the recommendation of the Fire, Water and Light Committee, as given above, practically pledged the City to the adoption of the Vancouver Co.'s project.

This request was granted without protest from the Vancouver Company. On February 9th, the same company asked for a further postponement of action for two weeks, promising to give the city as favourable terms as those given by the Vancouver Co. The request was also granted without opposition.

To better guard its interests, the Vancouver Company then withdrew its proposition until such time as the Coquitlam Company should be in a position to make a final and definite offer.

On March 14th the fourth and final offers of both companies were laid before the members of the Council.

The Vancouver Waterworks Co. proposed to construct and operate their works in consideration of a guarantee from the city of 3 per cent. interest on the actual cost of the works, such guarantee to extend over a period of 10 years from the date of completion of the works, and not to be on a greater sum than \$275,000. They agreed to furnish water for fire purposes free, and to place hydrants at all points along the lines of their pipes, which might be selected by the city authorities, the rental of each hydrant being \$25 per annum. Also to sell the works to the city authorities, when so required, in accordance with the terms of the purchase clause in their Act of Incorporation, and finally, to provide a sufficient supply of water for all purposes within eighteen months after the acceptance of their proposition by the city.

On the other hand the Coquitlam Co. requested a guarantee of 3 per cent. interest per annum, on the company's bonds, to an amount not exceeding \$280,000, for a period of 20 years, the guarantee not to begin until the completion of their works, the amount guaranteed to be lessened by a sinking fund, which would make the total equal to a guarantee on the same amount for 10 years. Water for fire purposes was offered free, and a lien on all receipts promised the city up to the amount of its liability for interest. Also, if so desired, the company undertook to make over to the Corporation an interest equal to $\frac{1}{2}$ per cent. on the net profit received from that portion of the works embraced in the Vancouver system.

On March 22nd, at a full meeting of the Council, in accordance with the repeated request of the Vancouver Waterworks Co., a motion was made to submit both schemes to the consideration of a competent hydraulic engineer, for an opinion as to the merits and cost of each. On a vote being taken this motion was defeated, the division being 4 for the motion and 6 against it.

A motion was then made to adopt the Coquitlam Company's proposal, which was carried by the same majority.

Notwithstanding this refusal on the part of the Council to assist their judgment in arriving at a conclusion as to the project most suitable for the city, by asking the aid of professional advice on both schemes, the data of the proposed Coquitlam works, as furnished by their engineers (who were also directors and promoters) was forwarded, under instructions of the City Council, early in April, to a San Francisco engineer for his approval, the city authorities in the meantime preparing an agreement to be entered into by that company.

On May 10th, a by-law was published, embodying an agreement between the City Council and the Coquitlam Water Works Company. Much interest was evinced in the matter by citizens of all classes, and a general opinion prevailed that the Vancouver Water Works Company had been

unfairly dealt with. Among the many reasons for opposing the by-law which were advanced and discussed, may be briefly mentioned the following:

That the Council, after voting down a motion to submit both schemes to the opinion of a hydraulic engineer, adopted the Coquitlam scheme, and submitted that scheme alone to a San Francisco engineer for his report.

That the Coquitlam Co.'s actions throughout had been characterized by unusual secrecy, inasmuch as they had been unwilling to give details of their scheme, or to show proper plans, and had repeatedly changed their financial proposals, the length of their system, and the elevation of their point of supply.

That they had in the first instance requested a guarantee of 6 per cent. per annum for 20 years on \$500,000 equal to 3 per cent. on \$1,000,000, and finally agreed to accept 3 per cent. on \$280,000 for 10 years, being a total drop of nearly three-quarters of a million of dollars.

That the length of their system, as finally claimed, was 20 miles against the 10 miles of the Vancouver system.

That the City could not acquire the works by purchase on demand.

That the agreement guaranteed only 3 miles of distribution pipes, when 15 miles would be required at an early date.

That the water supply was of questionable purity?

That the privileges offered by the company were of little value, because the company was under no obligation to commence construction within a given time, and the city pledged its credit for \$280,000 leaving the company at liberty to tap their mains for the benefit of other towns, and that complications were liable to arise between Vancouver and other cities, if supplied by the same main.

That it was not possible to construct the works for the estimated cost.

So decided and general were the expressions of the voters on these and many other points, that the Vancouver Company deemed it right in the interest of the city to publicly guarantee the ratepayers, that should the By-Law fail to become law, they would, as they had originally intended, construct their works without any aid whatsoever from the city, and that operations would be begun immediately the By-Law was defeated.

Fully relying on the integrity of the Vancouver Company, a large majority of the citizens voted against the Coquitlam By-Law on the 4th of June, 1887.

The defeat of the By-Law relegated both companies to the same position they occupied previous to their negotiations with the city, each being on an equal footing, and free to carry out their projects as they might deem best.

The Coquitlam Co. had not the courage to remain in the field, and face, unaided, the risks attendant on the enterprise. From the hour the defeat of the By-Law guaranteeing the interest on their bonds was known, that company has taken no active steps so far as regards a supply of water to the City of Vancouver, their charter for which expired on April 6th, 1890, an application for its extension having been refused by the Legislature in their session of 1889.

The Vancouver Company, true to their promises, and in the firm belief that the Council and citizens would duly cognise and appreciate at its proper value the benefits the company were conferring on the embryo city, by risking such a large capital in an undertaking, the financial success of which was very far from being assured, at once began preliminary steps towards construction, having submitted their scheme to the judgment of Thomas C. Keefer, Esq., M. G., Pres. Am. Soc. C. E., and obtained from him the reports, of which the following are copies:—

VANCOUVER, B. C., 29th October, 1887.

J. W. McFarland, Esq., Secretary Vancouver Water Works Company, Vancouver.

SIR :—According to the request contained in your letter of the 11th inst., I have examined the plans of the proposed works for the water supply of the City of Vancouver.

I have not thought it necessary to make a personal examination of the ground in the Capilano valley, which has been thoroughly surveyed instrumentally, because from the rough and wooded character of the route, nothing but actual levels, measurements and test pits will afford any information to a visitor.

THE DAM.

A favorable site has been selected, as shown by the plans, at the required elevation, and I do not think there will be any difficulty in constructing a reliable dam.

A dam is required in any case to maintain the river surface at a fixed minimum level, and thus secure a constant supply into the mouth of the pipe. In this case, to secure the required elevation to overcome the ridge at the Big Canyon, $2\frac{1}{2}$ miles below the site of the dam, it is necessary to establish the crest of the latter above the low water level of the river, making a total height of dam from the bottom of the river of about 15 feet. It should have a width not less than 50 feet at bottom and be provided with a sluiceway having its bottom level at low water mark, and width of 15 feet to be closed by stop logs, and used to secure the final planking of the tumbling way, as well as to protect the approaches to the dam, if necessary, during freshets. Horizontal apertures between the first course of timbers above low water, should be lined with plank and used to keep down the water until the dam is completed.

The length of tumbling way or crest of dam should be 125 feet, and the height of the abutments and approaches above this crest, six feet.

As the dam is the key to the whole position, it should be constructed in the most substantial manner, with liberal provisions for safety against extreme rises of water, of which, in this case, no records exist, and for this purpose I understand timber and stone in abundance can be obtained upon the spot; ample dimensions can therefore be secured at the minimum of cost. In the construction of the pipe chamber or well in the dam, provision should be made for taking out another and a larger pipe for the future.

I have submitted a general plan for such a dam as contemplated to your engineer, and am satisfied it will meet all requirements of the case.

THE PIPE LINE.

It is most important that the pipe should be placed where it will not be exposed to displacement by slides or damage through fire. In all cases it should be carried under water-courses and sufficiently covered to protect it from falling timber. As far as possible, large trees in dangerous proximity to the pipe should be cut down.

CROSSING AT THE NARROWS.

The contract for the flexible pipe being only for the distance between the lines of low water, I think that, simultaneously with the laying of this pipe, it should be extended on both shores above high water mark, by a twelve-inch rivetted steel pipe. Steel is more reliable, cast iron more durable only on account of its greater thickness. I would advise an extra heavy plate of steel for these pipes, which will be submerged at every tide.

At the termination of this twelve-inch line above high water mark, a Y, or branch pipe, 16 inches in diameter at the stem, and 12 inches diameter for the branches will be needed, with four twelve-inch stop-cocks, two upon each side of the Narrows, one upon each twelve-inch. These stop-cocks to have the bottom of their chambers above highest tides. This arrangement is necessary to enable you to lay the other twelve inch flexible pipe across the Narrows with-

out stopping the supply to the city, as well as to maintain the supply after both are laid, in case of accident to either.

The double line of pipe is adopted to give double security at a point where repairs cannot readily be made, and until the line is here doubled, the risk of a protracted stoppage of the whole supply must be incurred. On this account, as well as the fact that the full capacity of the 16-inch cannot be had until the 12-inch is doubled at this crossing, I assume the second line will shortly follow. It would give more confidence in the works, if it were done at the first.

The flexible pipe on the south shore, rests upon rock, if not protected by excavating a trench for it, this protection must be given by building crib-work over it, to a depth of ten feet below low water mark.

COAL HARBOR CROSSING.

The main here crosses where the width at low water is only 280 feet and the depth 5 feet with a mud bottom of unknown depth.

I would advise the filling up of this portion with solid material from the adjacent banks, so that the pipe may be laid above low water mark, and thus be accessible while the tide is out. It would be still better if it were carried above high water on piles, as the length of crossing at high water mark does not exceed 1,000 feet.

DISTRIBUTION.

I have arranged the plan of distribution, not only for the district first to be supplied but for the possible future of the city, so that the work now done will form part of a complete system.

THE MAIN.

As your reservoir is above the dam on the Capilano, when once the water is admitted to the city, it will be impossible to make any connections with the mains without suspending for the time the supply to the whole city. All

future supplies from the main must be provided when the latter is laid and every branch which leaves this main must be provided with a stop-cock close to the main, so that in case of necessity, the branch can be unwatered without emptying the main. Georgia street affords the best route for the main, and it should be carried full size to Granville street, bringing the full body of water upon the high ground at the C. P. R. Hotel. Here it may be reduced to 2 inches, and be transferred to Hastings street, along Granville street, and thence along Hastings street to Westminster avenue.

This will bring the water in sufficient quantity within the reach of that portion of the city south of False Creek, as well as provide for extension eastward.

The number and position of hydrants will rest with the city authorities, but as the company proposes to supply and maintain them, I would advise that the 4-inch pipe which supplies the hydrants should have a stop-cock, so that the hydrant, if damaged, can be replaced without unwatering the street or district in which it is placed.

A good distribution is necessarily expensive, on account of the many valves and connections it requires, but as all these are necessary sooner or later, and they can be provided more efficiently and economically when laying the pipes than at any later period, and more especially will prevent disputes and complaints on the part of the corporation and consumers, it is wise economy to incur the outlay at the beginning.

The hydrant valves and special castings should be manufactured at Victoria or Vancouver, the patterns to be the property of the company. This will forego the necessity of having a full stock of imported ones. If the first outfit be imported they should be manufactured by first class makers in the best manner, as should be the cast iron pipes, and all work thoroughly coated by Dr. Angus Smith's patent process. All should be manufactured under inspection, by faithful and competent men, who can be procured on the

spot, on the recommendation of some eminent English engineer, or some commercial house through which similiar contracts have been made.

RESERVOIR.

It is desirable, on many grounds, that there should be in the future, a reservoir, at sufficient elevation, and as near the centre of distribution as practicable.

I understand that the bluff on the south side of the Narrows on the Government Reserve has an elevation of 200 ft. which would command the higher portions of the city for domestic supply. I also understand that there is high ground south of False Creek sufficiently high and of a character suitable to the economical construction of a reservoir. This, or any position east of Westminster Avenue, (if there is high ground near enough in that direction,) would be the best, because it would place the distribution between the reservoir and the source of supply and thus double the efficiency of the pipes.

With the reservoir above the dam on the Capilano, which is ten miles distant from Columbia Avenue, the lowest street, and a central point, in the distribution, the time will come when increasing consumption will reduce the pressure upon the higher levels, as has been the case in Victoria, especially during the daylight hours of greatest consumption, and this while the main is ample for the whole supply of the 24 hours. If there were a reservoir at sufficient elevation it would prevent this loss of head during the day, and would store the surplus delivery of the main during the night, and thus postpone the bringing in of a larger supply from the Capilano. It would also secure a supply for the city in case of accidents or needed repairs to the country main. In connection with this system, reflex valves would be needed in the 12-inch pipes, on the south side of the Narrows.

All that is desirable, now, in this connection, is that the site should be secured before it is otherwise occupied.

PIPE YARD.

One of your first requirements will be a centrally situated pipe yard, for which at least a couple of lots should be secured. Lead pipe, brass work and all small or portable castings will be stored in a building under lock and key, and heavy castings, pipes, etc., under sheds. The building should be large enough for a work shop, store room, office and proving press.

I have the honor to be sir,

Your obedient servant

THOS. C. KEEFER.

OTTAWA, 19th December, 1887

T. W. McFarland, Esq., Secretary Vancouver Water Works.

SIR:—I have yours of 8th December, with reference to my report upon the engineering features of the Capilano scheme, which you have adopted, and requesting further that I would express my opinion upon its merits as a whole.

The plan is a gravitation one, the simplest of all, and one which can be maintained with the least annual outlay or maintenance. The quality of water is the best which can be found, drawn from a mountain canyon, and not exposed to any possible deterioration or diminution by the future settlement of the country. The quantity is abundant for the supply of the largest city upon this continent.

The only objection which has been, or could be raised to the Capilano scheme, is the supposed risk connected with the submerged pipe across the Narrows. This is no experiment, similar pipes having been employed in many places for many years, and under heavy pressures. You have put the execution of this work in the hands of an experienced contractor in this field, who is also an able hydraulic engineer and who is only repeating what he has done successfully elsewhere.

It is impossible for Vancouver, or any other city, to have a superior system of waterworks to that which is within your reach. Your great pressure secures the best possible system for fire protection, that of direct pressure from hydrants without the intervention of steam fire engines, and without their cost and expense of maintenance. This is the first desideratum in waterworks for any town which is not fire-proof, and as it will effect a large annual saving in fire insurance, the city will no doubt be willing to pay for it in proportion to its value.

I have no doubt that your work, when carried out as proposed, will be a complete success, and prove a valuable property to the shareholders, and an inestimable boon to the citizens.

I remain,

Very truly yours,
(Signed,) THOS. C. KEEFER.

The company has also been further confirmed in the adoption of its scheme by a report obtained by them from Mr. W. R. Eckhart, Member American Society of Civil Engineers, and Vice President of the Society of Mechanical Engineers.

This report is of great length and considerable detail, the substance of which is summarized in the following paragraph, with which the report concludes:—

* * * * *

"I have examined into many schemes for proposed water works, both in California and elsewhere, but none seem to combine all the advantages that the Capilano River affords your city."

On June 8th, four days after the defeat of the by-law, two fully equipped survey parties left Vancouver for the purpose of finally staking out the line of the mains, and obtaining absolute data on which contracts might be let. Immediately on their return, on the 8rd of August, tenders for clearing, close cutting and grubbing within the company's right of way, were publicly invited.

On the 1st November, 1887, a contract for furnishing and laying the first of the proposed double line of flexible mains across the first Narrows was let to the inventor and patentee of the flexible joint, Mr. John F. Ward, late chief engineer of the Jersey City Waterworks.

Mr. Ward had made a specialty of laying submerged pipes for many years, and his reputation for success in works of this character was well known throughout Canada and the United States.

The pipe was delivered at Vancouver, and the operation of laying it was commenced by Mr. Ward, on the 21st April, 1888, but owing to the exigence of his affairs, as he stated, Mr. Ward returned to the East, and after the lapse of some weeks he notified the company that he was not in a position to return to Vancouver, and must therefore officially abandon the work.

On the 23rd of December, as soon as the work of clearing had been sufficiently advanced to admit of further operations, tenders were invited for the construction of the dam across the River Capilano at the point of supply. This contract was awarded on the 24th January, 1888, and was completed on the 18th of April following.

In the meantime the company had been in communication with steel pipe manufacturers in England, with a view to the purchase of steel mains. It was found however, that much more favorable terms could be obtained from a local firm. This contract was therefore let to the Albion Iron Works, at Victoria.

Contracts for cast iron distribution pipes, lead, and other necessary material, were also entered into, so that at the beginning of the year 1888, seven months after the company's promise to the electors of Vancouver, the whole of the works were well under way.

Pending the manufacture of the steel mains and the arrival of the cast iron pipes from Scotland, contracts were, in consequence of the failure of Mr. Ward to carry out his contract for this work, entered into with a local firm for completing the laying of the submerged main across the first narrows, and for the necessary works of excavation, re-filling, tunnelling and laying the mains north of Burrard Inlet. The first submerged main was successfully laid on August 28th, 1888, and all the other works having been completed by the 25th day of March, 1889, water from the Capilano River was on that date for the first time carried under Burrard Inlet to the south shore and distributed through the City of Vancouver, the company thereby redeeming in every particular the promises made to the electors previous to the defeat of the Coquitlam Waterworks Co.'s By-Law.

The whole period occupied in constructing the above works, amounting in value to about \$300,000 00, was only 22 months; and subsequently, a second main was laid under Burrard Inlet, in accordance with the Company's original plans.

Since the 1st May, 1889, on which date the water supply to the City of Vancouver was inaugurated, the Vancouver Waterworks system has been in constant and successful operation. Beyond such accidents as are common to all works of water supply, and without which no system has yet been operated, there has been no interruption to the service. Two of these accidents occurred in that portion of the line most difficult of access, namely the submerged mains, but even these were repaired with but little delay. In connection with this matter, it may be mentioned that both these accidents were preventable. The first took place in October, 1889, and was without doubt due to an excessive water ram, acting on a casting which, though it had proved itself sufficiently strong to resist the test pressures of 300 pounds per square inch imposed on it previous to and after immersion, was not strong enough to withstand the sudden

shock of a water ram. How this ram originated, it is impossible to definitely state; but it is a significant fact that just at that time the city authorities were engaged in making test trials of the power of the different hydrants. The opening and closing of valves during these operations was of constant occurrence, and ignorant or reckless handling would have certainly created hydraulic shocks that would permeate the whole system till a vent was found at some weak casting.

The second accident occurred in November, 1890. The steamship *Abyssinia* in passing through the Narrows in a fog, touched both pipes, crushing in the wrought iron main, and breaking off entirely 4 feet of the cast iron main. In a certain sense the company admit blame in this latter accident, it having been a part of their original programme to amply protect the shore ends of both mains, as a provision against such an occurrence. The heavy expenditures already incurred together with the considerations herein-after mentioned, had, however, delayed the carrying out of this detail, the chances of such an accident being considered remote.

It has been claimed by the Council of Vancouver, that the company do not provide sufficient pressure for the service and that their works are not capable of doing so. This contention is based on the fact that, up to the present the company have not considered it judicious to operate the system with the unusually heavy pressure which is known to be at their command. They have deemed it unadvisable to constantly subject their works to the wear and tear of an altogether unnecessary pressure, when all the requirements of the city can be, and are, amply supplied by a pressure more in accord with that furnished to other and more populous cities. Under this conviction, a pressure reducing tank was constructed at an elevation of 255 feet above tide level, and within $2\frac{1}{2}$ miles of the city boundary. This tank is provided with a connection casting and slide valve by means of which the full pressure of the whole

system can be immediately turned on when required. A telephone connects the city with this tank, and a watchman is on guard there day and night.

A pressure of 255 feet is considerably above the average of Canadian and American cities. With this elevation an ample supply of water can at all times be furnished, and a constant pressure of 131 feet, or 57 lbs. per square inch maintained at a height of 108 feet above the sea level. This is the elevation of the hydrant nozzle at the C. P. R. Hotel, and is one of the highest points within the city. The value of this pressure may be readily understood when it is stated that by means of it 112 gallons per minute can be discharged through the unusual and rarely required length of 500 feet of rubber hose, with a 1-inch nozzle, throwing the stream to a vertical height of 67 feet, and a horizontal distance of 95 feet. In addition to this most effective fire service, it must not be forgotten that by a simple telephonic message to the pressure tank, the full pressure due to the elevation of the point of supply at the dam, 417 feet or 181 pounds per square inch can be turned on forthwith.

The Council also contend that although this latter pressure can be obtained, the company's mains are incapable of resisting it. The unreasonableness of this contention is manifest, when it is stated that the weakest portion of the mains are calculated to resist four times this pressure. The Council has been informed of this fact, and the company have signified their willingness to turn on and maintain the unusual pressure of their system if the citizens, whose connections might be affected by the excessive pressure, offer no objections.

The company has been censured for not having extended the sub-mains when required, for the sparsely occupied outlying portions of the city, and the immediate construction of a reservoir within the city limits has been urgently pressed upon them. In regard to the former, the company considers that the 17 miles of feeding pipes laid throughout the

city meet all present pressing requirements, and an extension to the less populated districts is intended to be carried out in due course, if the works continue in the company's hands.

The construction of a reservoir and other works to give increased efficiency to the system, has been under consideration for some time past, and would, as well as the other works before alluded to, viz: protection of the submerged mains and extension of the water service throughout the city, have been undertaken soon after the opening of the works, but for the company's financial operations being hampered by the purchase clause in their act of incorporation, which gives the city the right to demand the sale of the works when required, and further, in consideration of the fact that negotiations for the purchase of the works have been constantly pending during almost the whole of the period since the successful completion of the works.

On the 14th May, 1890, the Council of Vancouver instructed Mr. Herman Schussler, of San Francisco, the same gentleman who, at the request of the Vancouver Council had reported favorably on the Coquitlam project, to examine and report on the Vancouver Water Company's works. This gentleman accordingly furnished them with a report and an approximate estimate of the value of the works, based on a few days' examination, which estimate, however, entirely omits all the usual allowances for organization, surveys, engineering, and clerical work, and other necessary incidental costs, nor does it include any allowance for the important item of the second submerged main under Burrard Inlet and Coal Harbor, the pipes for which had been delivered at the time of Mr. Schussler's estimate. Those under the Inlet have since been laid, which, together with the 16-inch pipes ready for Coal Harbor, represent at the present date an expenditure of \$23,712 71 by the company.

The company received no official copy of Mr. Schussler's estimate and the results of his investigations, but learned from the local newspapers of the 19th June, 1890, that he

had estimated the cost of the actual works up to that date at \$251,000. In the face of this estimate, compiled by their own agent, and presumably reasonably correct in his opinion, as far as could be ascertained, the Council have seen fit to offer the company \$211,000 for the whole works.

The following is a statement of facts of the negotiations with the Council for the acquisition of the Vancouver Waterworks Company's works, which have taken place from time to time up to the present date, consisting principally of copies of correspondence.

Shortly after the water was laid on, the city authorities commenced to informally negotiate for the acquisition of the works, and interviews between members of the Council and members of the Directorate of the Company, took place at the request of the former from time to time, as the result of which interviews the following correspondence took place between the Company's Secretary and the City Clerk.

VANCOUVER, B. C., Sept. 9th, 1889.

Thos. F. McGuigan, Esq., City Clerk, Vancouver.

DEAR SIR:—Referring to the meeting of this company and members of the Fire, Water and Light Committee, held in the City Hall on August 29th, I am directed by the President to request that a decided answer be given to the subjects touched upon at that time, more particularly that which referred to the question of the city's purchase of the works of this company.

It is requested that an answer be given not later than the 25th inst. The reason for this is that the company have arranged for a large loan for the purpose of extending and completing the works, but do not wish to close the arrangements entirely before knowing the feeling of the City Council in regard to the purchase, as it would entail a much larger expense to the city by purchase after the loan is effected than before, both in the rate of interest (as no doubt the city could borrow money on much more favorable terms than a private company could), and on the increased amount on which the 20 per cent. would have to be added.

If the Directors do not hear from your honorable body on or before the time stated above, it will be taken for granted that the City does not desire to purchase, and the company will be in a position to carry out their plans, which at present are somewhat disturbed through their ignorance of the city's intention.

I am, dear sir, yours faithfully,

J. W. McFARLAND,

(Signed), Sec'y V. W. W. Co.

To this the following reply was received:—

VANCOUVER, B. C., September 24th, 1889.

Joseph W. McFarland Esq., Secretary of Vancouver Waterworks Co., Vancouver, B. C.

DEAR SIR:—In reply to your letter of September 9th, 1889, I am instructed to inform you that the city will be prepared to negotiate with your company with a view of acquiring its system of Waterworks.

I have the honor to be,

Yours very truly,

(Signed) THOS. F. MCGUIGAN,
City Clerk.

VANCOUVER, B. C., Oct. 5th, 1889.

To the Mayor and Aldermen of the City of Vancouver, B. C.

GENTLEMEN:—With reference to my letter of 9th September, and your City Clerk's reply thereto, dated 24th September, I beg to say that same was forwarded to our President, Capt. John Irving, Victoria, and I am directed to inform you that as we have received no decided answer to my letter of the 9th September, we will continue our negotiations for a loan.

We would, however, suggest that the city (if it has any intention of purchasing the works) should guarantee the interest, by which means the company would be able to borrow the money upon much more favorable terms. This would place the city in a position to assume the works at a much greater advantage, as the revenue will be ample to pay interest at the low rate your guarantee would assure us.

Our net revenue on the present capital is sufficient to pay 4 per cent., and is increasing.

Will you kindly notify me, at your earliest convenience, if this suggestion meets with your approval.

If it does not, we would be pleased to receive a positive answer with regard to the purchase of the waterworks by the city.

I have the honor to be, gentlemen,

Your obedient servant,

JOS. W. McFARLAND,
Secretary Vancouver Water Works Co.

VANCOUVER, B. C., October 23rd, 1889.

J. W. McFarland, Esq., Secretary Vancouver Waterworks Company, Vancouver, B. C.

DEAR SIR:—In reply to your communication of 5th inst., on the subject of the purchase of the Waterworks by the City of Vancouver, I have been instructed to inform you that a by-law will be introduced at the next regular meeting of the Council, to fix a price to offer your Company under the provisions of sub-section 5, sub head "B" of section 142, of the Vancouver Incorporation Act, 1886.

Yours very truly,

(Signed) THOS. MCGUIGAN,
City Clerk.

In November, 1889, a motion was brought up in the City Council to authorize surveys being made for a pipe line from Coquitlam River and Seymour Creek, with the idea of sup-

plying the City of Vancouver with water from either of those sources, but on being brought to a vote it was defeated.

Shortly after this the city advertised its intention to apply to the local Legislature to amend its Act, to enable it to construct an independent system, and asked for power to take water from the Coquitlam, Capilano or other sources.

In consequence of this action, The Vancouver Waterworks Company, applied to the Legislature for an amendment to their Act of Incorporation, by repealing the 35th clause thereof, which provided that on certain conditions the city had the privilege of purchasing its system of waterworks.

Representatives of the city and of the waterworks company appeared before the Private Bills Committee and by mutual consent both applications for amendments to the respective charters were withdrawn, and an agreement was entered upon the minutes of the Private Bills Committee, a copy of which is as follows, and is further referred to in the Journals of the House, 1890, page 57:

March, 12th, 1890.

Committee met in Library.

Present: Messrs. Martin, Semlin, Orr, Duck and Cunningham.

Mr. Eberts appeared before the committee as solicitor on behalf of the promoters of a Bill to amend the Vancouver Waterworks Co's Act, 1886, and stated that an understanding had been arrived at between the Mayor of the City of Vancouver and the President of the Vancouver Waterworks Company, by which the promoters of the Bill to amend the Vancouver Waterworks Co. Act, 1886, (hereto annexed and marked "A") agree to strike out the clause amending section 12, and repealing section 35 of the Vancouver Waterworks Co. Act, 1886. And the Corporation of the City of Vancouver agree to strike out section "6" (six) in their Bill for an Act to amend the Vancouver

Incorporation Act and amendments thereto, (hereunto annexed and marked B.)

And that if the negotiations for the purchase of the Vancouver Waterworks are not consummated between the City of Vancouver and the Vancouver Waterworks Co., prior to the 15th day of December, 1890, then the company may be at liberty to apply to the Legislature to amend section 35 of the Vancouver Waterworks Act, 1886, by inserting in it a clause to limit the time under which the City of Vancouver can purchase under the section, and upon such application to amend section 35 of the Vancouver Waterworks Act, 1886, the Corporation will not oppose a reasonable time limit.

Mr. Hammersley on behalf of the City of Vancouver, assents to the above arrangement.

(Signed) GEO. B. MARTIN,
Chairman.

The Bill to amend the Vancouver Waterworks Act was then withdrawn, and the committee then proceeded to consider an Act to amend the Vancouver Incorporation Act, 1886, and amendments thereto, and agreed to report the Bill with amendments.

The Bill so amended was accordingly passed (City of Vancouver Incorporation Act, 1886, Amendment Act, 1890.)

The first definite proposal by the Corporation for the purchase of the works was contained in a letter from the Clerk of the Council, of which the following is a copy :

VANCOUVER, B. C., July 8th, 1890.

To the President and Board of Directors of Vancouver Waterworks Co. (Limited), Victoria, B. C.

SIRS :—I have the honor to inform you that the Council of the City of Vancouver has by by-law numbered 101, and dated June 30th, 1890 (a copy of which by-law I enclose) fixed a price to offer for the works and plant of your company, under the provisions contained in that behalf in

by-section (b), section 5, clause 142, of the Vancouver City Incorporation Act, 49 Victoria, cap. 32, and on behalf of the City of Vancouver I have to give you notice that the price fixed by the said by-law for the said works is \$211,000.

I have the honor to be, gentlemen,

Your obedient servant,

(Signed) THOS. F. MCGUIGAN,

[SEAL].

City Clerk.

BY-LAW No. 101.

A By-Law to fix a price to offer to the Vancouver Waterworks Company for their works.

Whereas it is necessary and expedient that the corporation of the City of Vancouver should own a system of Waterworks for supplying the city and its inhabitants with water.

And whereas the Vancouver Waterworks Company is a company incorporated for the city and has a system of waterworks for supplying water to the said city, established.

And whereas it is necessary by By-Law to fix a price to offer to said company for such works.

Therefore be it enacted by the Mayor and Council assembled:

That the sum of \$211,000 be fixed as a price to offer to the Vancouver Waterworks Company, for the works of said company, and that said price be offered therefor.

That a notice of such price be communicated to said company by the City Clerk, with an offer of such price to said company for the said works.

Done and passed in open Council, this 30th day of June, A. D. 1890.

(Signed) D. OPPENHEIMER,
Mayor.

[L. S.]

(Signed) THOS. F. MCGUIGAN,
City Clerk.

Then, upon the advice of their legal advisers, the Company applied to the Supreme Court for an injunction to restrain the Municipal Council from proceeding with this By-Law. The Company applied to the Court and obtained from the Court an expression of the opinion that it was not competent for the City to acquire the Vancouver Waterworks Company's property otherwise than under clause 5 of the Company's Act of Incorporation, except with the consent of the Company.

On 22nd October, 1890, Sir Joseph Trutch, one of the Directors of the Vancouver Waterworks Co., reported that he had had an interview with Mr. A. St. G. Hammersley, City Solicitor of Vancouver, with reference to the negotiations for the purchase of the Company's works by the City, and the following letter was written :—

DEAR SIR :—With reference to my interview with you to-day, when you apprised me of the views of the Municipal Council of Vancouver respecting the acquisition by them of the works and property of the Vancouver Waterworks Co., at as early a date as practicable, and made certain suggestions in relation thereto, I beg to inform you that I have since conferred with the Board of Directors of our Company, and am authorized to state that :

1st. Upon receipt of notification from the Corporation of Vancouver of their intention to acquire the Company's works and property under the provisions of the Vancouver Waterworks Act, the Company will readily proceed at once to arbitration under that Act, to determine as soon as may be found practicable, the value of the Company's works and property.

2nd. But they consider it inexpedient to enter into any arbitration as to the value of the company's works and property, otherwise than under the provisions of that Act, or to name, before such value has been duly determined, any fixed sum in lieu of the bonus and interest prescribed under section 35 of the Act, as to be paid to the Company in addition to such value.

I beg also to take this occasion to represent, on behalf of the Board of Directors of our Company, that further expenditures on these works are requisite in the interest of the owners of the property, and for the benefit of the community of Vancouver in general, in order to secure the complete efficiency of the works, and to extend the water service over the whole area of the city, but the company are withheld from undertaking such additional outlay by the intimation given them by the Municipal Council of Vancouver of their desire and intention to acquire the works forthwith.

Yours faithfully,

(Signed) JOSEPH W. TRUTCH.

A. ST. GEORGE HAMMERSLEY,

Vancouver City Solicitor.

On 27th October, 1890, the Water Works Committee of the City Council, reported that they had received a proposition from the "Phoenix Water Works Company," for supplying water to the city, and asking for a guarantee of interest on their bonds.

GENTLEMEN,

On behalf of the Phoenix Waterworks Company, it being their intention, subject to approval by your Council, to construct waterworks for the supply of the City with water, we beg to request that your Council will grant permission to the company to lay pipes, etc., for the conveyance of water under the streets of the city, and to construct within the city limits the necessary works for a water supply for the residents of the city. In order that the works should be thoroughly good and worthy of the city in every respect, and that the city should derive full benefit therefrom, in consideration of the company supplying the city free of charge with all water necessary for public purposes, and for any industries or manufactories that might, from time to time, be bonused by your Council ; also, in consideration of the company providing a proper and effective water pressure so that the system will be thoroughly effi-

cient in case of fire ; we have to request that the city should guarantee the debentures of the company to the amount of \$350,000 and interest thereon for a period of years, or make an advance of that amount to the company for a period of years.

If your Council agrees to guarantee the debentures of the company or to make the advance, the whole of the property of the company could be hypothecated to secure the due payment of the moneys.

The water rates to be charged, from time to time, could be regulated by your Council and the company, by mutual agreement.

We beg to request your favorable consideration of the above, as the company wish to commence the work as soon as possible, and are in a position to thoroughly satisfy your Council as to the stability and efficiency of their proposed work.

We are, yours truly,
(Signed) DRAKE, JACKSON & Co.

VANCOUVER, B. C.,

Oct. 20, 1890.

The committee recommended the acceptance of this offer with following amendments.

"Amount to be guaranteed, reduced from \$350,000.00 to \$300,000.00, with interest at the rate of $4\frac{1}{2}$ per cent. City to collect all water rates, and after deducting all charges for interest on debentures, sinking fund and expenses, hand the surplus over to the Company.

"City to have the right to purchase the works at any time at actual cost and 5 per cent. added to that amount.

"All work to be done to the satisfaction of the City Engineer and the Water Commissioners."

"At the same meeting of Council, a notice of motion was given, to bring in a by-law to give a guarantee on above terms to the Phoenix Waterworks Company.

In consequence of these proceedings in the City Council, and as the City Solicitor had not, so far as the published reports of the Council meeting shewed, presented the letter written to him by Sir Joseph Trutch on behalf of the Waterworks Company, dated Oct. 22nd, 1890, for their consideration, it was considered advisable by the Directors to write the following letter:—

VICTORIA, B. C., 31st October, 1890.

To His Worship the Mayor and the Aldermen of the City of Vancouver, B. C.

GENTLEMEN :

On the 22nd inst, Mr. Hammersley, City Solicitor of Vancouver, acting, as we understand, under your instructions, had an interview with Sir Joseph Trutch, one of our directors, respecting the acquisition of our company's works and property, by the Corporation of Vancouver, and at Mr. Hammersley's request, a letter was addressed to him by Sir Joseph Trutch, conveying the conclusion of our company as to certain suggestions made by Mr. Hammersley.

As we do not learn that that letter has been laid before you, it occurs to us that it may not have been considered as sufficiently authorised by our company to warrant its being so dealt with, and therefore, as we desire to render it certain that our views expressed in that letter should be at once made known to you, we beg to furnish you with the following copy of it viz:—

(For letter, see page 27.)

* * * * *

This letter we now beg to confirm, and we desire to add that we have been ready since our undertaking was successfully accomplished and the water services in Vancouver initiated, and have on every occasion expressed—as we do now—our willingness to facilitate by any means in our power, the acquisition of the works by the Corporation of Vancouver, under the provisions of our Act of Incorporation.

We have to state further, that although we do not perceive any suitable means of arriving at a satisfactory and binding valuation of these works otherwise than by arbitration under the provisions of our Incorporated Act, we will, in the desire to meet the views of the Corporation, give the fullest consideration to any proposal the Corporation may find themselves in a position to make to us, a binding offer for the purchase of our works and property on fair and reasonable terms, based on due consideration of our risks in the enterprise.

We have accordingly delegated and fully empowered two of our Directors—Sir Joseph Trutch and Mr. D. M. Eberts—to act definitely in our behalf in any and all dealings with the Corporation in this matter.

As we are led by Mr. Hammersley to suppose that misapprehension exists as to the proper interpretation of the provisions of our Act in respect of interest on our outlay, we think it advisable to state that we understand that the rate of interest guaranteed under those provisions, is to be 10 per cent. less the amount of net revenue collected, that is to say, should the net revenue, after all proper expenditures on account of maintenance and management have been defrayed, amount to (say) 6 per cent. on the company's stock capital, the company would be entitled only under the provisions to have the rate of interest payable to them made up to 10 per cent., that is to say, to the extent of the difference in the case supposed, between 6 per cent. and 10 per cent.

We desire to add further with reference to the concluding paragraph of Sir Joseph Trutch's letter to Mr. Hammersley, that unless your Corporation communicate to us authoritatively your desire to the contrary, it is the intention of our company to proceed at once with the additional requisite works therein mentioned, by the construction of a reservoir, the extension of the mains, and the carrying out of other works necessary to secure the complete efficiency of the water service, the expenditures on which have so far been deferred solely in consideration of the intimations we have received

of your desire to acquire our works forthwith, and to have these expenditures made under your direction.

I am gentlemen, your obedient servant,

(Signed) JOHN IRVING,
President.

On behalf of the Board of Directors of the Vancouver Water works Co.

J. W. McFARLAND,
Secretary.

On the 4th of November, 1890, the following letter was received by the President of the Waterworks Co., from the City Clerk, and the following reply returned thereto:—

VANCOUVER, B. C., November 4th, 1890.

John Irving, Esq., President of Vancouver Water Works Co.,
Victoria, B. C.

SIR : I have the honor to enclose a copy of a resolution passed by the City Council of Vancouver, on Friday, the 31st October, 1890.

Resolved : That the amount to be paid, as the value to the city of the Waterworks Company's plant and system shall be fixed by arbitration. The arbitration to be held and conducted independently of the provisions of either the Act of Incorporation of the city or the company.

That the city appoint one arbitrator and the company another, the two arbitrators so appointed, to appoint an umpire. The arbitration to be closed within two months from the date of agreement to arbitrate.

In the event of the company agreeing to the above, the city will pay 10 per cent. on the amount awarded in addition by way of bonus to the company.

A reply is requested from your company within a week from date, as the city has certain offers made for the construction of waterworks by another company.

I have the honor to be, sir,
Your obedient servant,
(Signed) THOS. F. McGUIGAN,
City Clerk.

VICTORIA, B. C., November 4th, 1890.

Thos. F. McGuigan Esq., City Clerk, City of Vancouver, B. C.

DEAR SIR:—I am in receipt of your favor of the 4th inst., and note its contents.

Sir Joseph W. Trutch and Mr. Eberts have been appointed by the Directors of this company to act for, and on behalf of the company, upon any matters relating to the business referred to in your communication of the 4th instant.

I am informed that these gentlemen proceed by to-morrow's steamer to Vancouver for this purpose.

I have delivered your communication to Sir Joseph Trutch, who will reply to you definitely in reference to same.

Yours truly,
(Signed) JNO. IRVING,
President.

On November 5th and 6th, 1890, Sir Joseph Trutch and Mr. Eberts met the Water Committee of the Vancouver City Council in Vancouver and discussed the matter fully. As a result of this discussion, Sir Joseph Trutch, on behalf of the Vancouver Water Works Company, offered, without prejudice, to sell the works absolutely and at once for \$375,000.

At a Council meeting held on November 10th, 1890, the Waterworks Committee reported having met Sir Joseph Trutch and Mr. Eberts, on 5th and 6th November, after

considerable discussion and various offers being made by the Committee for the purchase of the works, all of which were refused, nothing definite was arrived at. The Waterworks Company offered to sell their works for \$375,000.00. On the 7th November, the Waterworks Committee met and resolved that the offer of the works for \$375,000.00 could not be entertained, but that a letter containing another and more final offer by the city should be forwarded to the company.

The City Council resolved that the following letter should be forwarded to the Waterworks company.

November 10th, 1890.

To the President Vancouver Water Works Co.,

SIR:—The City Council of the City of Vancouver beg to remind you that they have, on two separate occasions, passed resolutions which have been duly forwarded to you, with a view to coming to some amicable arrangement for the purchase of your waterworks system.

1. After having received an exhaustive report on your system of waterworks, and their present value and efficiency, from an engineer holding a high position in his profession, and on whose judgment in matters of this kind it is safe to rely, the city made you an offer of \$211,000 as the price they were willing to pay, that amount being calculated on the above report. To this offer the city received no reply from your company, but in lieu of any reply you commenced an action against the city and applied for an injunction in the Supreme Court of British Columbia to prevent the city taking any steps to procure a waterworks system.

The application was dismissed by the Court.

The city, still anxious that a fair and equitable arrangement might be arrived at, made another offer, as follows: the value of the said works to the city should be settled by arbitration and 10 per cent. on the amount so settled be added by way of bonus, the total so formed being payable

by the city to your company as the price. This offer your company has seen fit to refuse.

Your company then made an offer at the meeting lately held here between Sir Joseph Trutch and Mr. Eberts on behalf of the company and the Waterworks Committee of the City of Vancouver, to sell the works for \$375,000. This amount being so largely in excess of the valuation placed on the works by the Engineer appointed to value them, the city could not entertain.

All through the negotiations between your company and the city, there has apparently been a determination by your company that any proceedings to arrive at the valuation paid for your works should be arrived at under the provisions of, and as laid down by the 35th clause of your Act of Incorporation. In fact, the only letter received from your company in reply to the several letters sent by the city, and the verbal offers that have been made, expresses clearly that you insist on the city coming under the provisions of your Act, in order to arrive at the price of the works. The Council being desirous of meeting your company in every way, and going as far in their offer consistent with the rights and interests of the city as they can, beg to make one more proposition to your company, which must be considered final.

As your company is so desirous of having the price to be paid for the works fixed and arrived at under the provisions of your Act of Incorporation, and as it has been admitted by the representatives of your company that there is an ambiguity existing as to the meaning of the word "value" used in the 35th clause of the Act, in the following expression: "On payment thereof, to the said company of the value of the said works and property to be ascertained as hereinafter provided," the Council will agree that an arbitration should be held under the provisions of your Act, provided the word "value" shall be clearly defined before the arbitration is entered into, and a definite line laid down and agreed to for the guidance of the arbitrators as to how

they are to arrive at the "value" before they commence the arbitration, that is to say:

The Council consent to give the notice required by the 35th clause of the company's act, of their intention to acquire the works and property, provided your company agree that the arbitrators shall be bound by the following, in arriving at the value: They shall first of all decide the amount it took to construct the works, as they are at present, i. e. "the actual cost of construction," then they shall calculate the cost of placing the works in a thoroughly efficient and proper order, capable of bearing all necessary and proper pressure of water for use in the event of any fire within the city, and the cost of putting the whole system in thorough repair that may have been rendered necessary from the happening of accidents or otherwise since the completion by the company.

Having arranged this amount, that shall be deducted from the actual cost first arrived at, the difference shall be the amount payable for the work and all other property real and personal, to which will be added the additional amounts of 20 per cent. and sufficient to make up a 10 per cent. dividend as mentioned in the said 35th clause.

It may be pointed out that as your company appears to be satisfied that the works are in good, proper, sufficient order and capable of bearing all necessary pressure, there can be no reasonable objection to your agreeing to this proposal. The Council desire an answer to this further offer before Saturday, 15th instant, as it must be distinctly understood that these repeated offers have been made by the Council purely with a view of coming to an amicable arrangement and that this is positively the best.

Yours truly
(Signed) THOS. F. McGUIGAN,
City Clerk.

To which was sent the following reply:—

VICTORIA, B. C., November 14th, 1890.

Thos. F. McGuigan, Esq., City Clerk, City of Vancouver, B. C.

DEAR SIR:

I am in receipt of your favor of November 11th inst., to hand this morning. As the letter only reached me this morning, I fail to see how it would be practicable to give matters contained therein a full consideration, and give you a definite reply before the 15th inst., as to-day is the 14th.

I trust that the Council will perceive that it is impracticable for us to give a definite reply off-hand. I would state that the Board of Directors will take your offer into full consideration this afternoon, with the aim of giving you a definite reply at the earliest possible moment.

Yours truly,

JNO. IRVING,
President.

VICTORIA, B. C., Nov. 15, 1890.

T. F. McGuigan, Esq., City Clerk, Vancouver, B. C.

DEAR SIR,

I have before me your communication dated the 11th November, which was received by me yesterday morning, and has been to-day laid before all the shareholders of the Vancouver Waterworks Co., who are now in Victoria.

I am to convey the company's appreciation of the step your proposal now makes towards an adjustment of the points in issue between the Corporation and the Company and to assure you of our desire to approach the negotiation in a fair and business-like spirit.

We think it advisable in the first place in order to remove a seeming impression in the mind of the Corporation, of discourtesy on our part, to point out to you, regarding your allusion to a previous offer of \$211,000.00, that such offer was not made as a simple proposition, but was the preliminary step under Sec. 142. s. s. b. of the Vancouver Incorporation Act, towards carrying into effect the apparent design of the Corporation to either themselves construct waterworks or else to appropriate ours, under the provisions of the Incorporation Act. It was contended by us that such design was contrary to law, and that the by-law passed to give effect to it was nugatory, but in order to set at rest any doubt upon the subject, we applied to the court for an injunction to prevent the Corporation proceeding under their by-law. Upon the application, first the Chief Justice and then the Court of Appeal sustained our view, holding that the by-law was invalid, and that the Corporation could neither construct waterworks themselves, nor expropriate ours, except under sec. 35 of the Vancouver Waterworks Act, and that as consequently no danger threatened us from the Councils' nugatory proceedings, there was no occasion for an injunction, the application for which they accordingly dismissed.

In respect to your allusion to the report "from an Engineer holding a high position in his profession, etc.," the only report of which we are aware is that made by Mr. Schussler, and which was published in the newspapers, and this we can only regard as under the circumstances "ex parte," but even Mr. Schussler's report approved generally of our works, and valued them at a much higher figure than the \$211,000 above referred to.

I am not aware that our Company has admitted any ambiguity in the word "value" employed in section 35 of our Act of Incorporation—but as the Corporation is willing to arbitrate upon the basis of that section, we shall willingly meet the Corporation in the proposal to place the meaning of the expression "value" beyond question, and in the hope of settling this matter our Company is willing to concede much.

We are of course aware of an opinion which prevails, that owing to the leakage in the main when the water was first turned on, the pipes are defective and incapable of sustaining the necessary pressure.

Without concurring in this view, but in order to arrive at a solution of the matter, we are willing to allow this question to be taken into consideration by the arbitrators, and to submit to a deduction, should it be determined that any defects resulting from faulty workmanship in the construction of the main exist, and this we think will practically meet your views.

As an alternative therefore to your proposed basis of settlement, we beg to submit the following:

The arbitrators shall first ascertain our actual outlay on our enterprise.

To this sum they shall add 20 per cent., and sufficient to make up a dividend of 10 per cent. per annum, as provided by section 35 of our Act.

They shall then estimate the cost of remedying any defects arising from faulty workmanship, if any shall be found to exist in the construction of the main, and shall deduct such cost from the total arrived at, and the remainder shall be the amount payable to our company for the purchase of our works.

The twelve months' notice required by the Act, shall be waived.

I have the honor to remain,

Sir,

Your obedient servant,

(Signed) JOHN IRVING,
President.

At the meeting of the City Council held on the 24th November, 1890, it was resolved that "The Vancouver Waterworks Company having by their letter of November 15th, declined to accept the proposal made by the city for the purchase of their system of waterworks, as contained in

letter dated 11th November, which distinctly stated that the proposal therein made was positively the last," be it resolved "that the Council cannot entertain the proposal now made by the Vancouver Waterworks Company, to go to arbitration on any other basis than that offered by the city, and instruct the City Clerk to notify the said company that unless the City's proposal as contained in their letter of the 11th November, be accepted on or before the 1st of December next, the propositions for settlement as therein contained will be considered withdrawn."

A letter from the City Clerk embodying these views of the Council was accordingly addressed to the President of the Waterworks Company and was replied to as follows:—

VICTORIA, B. C., Nov. 29th, 1890.

Thos. F. McGuigan, City Clerk, Vancouver B. C.

DEAR SIR:—Your letter to me of the 25th inst., has been to-day laid before the Board of Directors of our Company, who have come to the following conclusions thereon.

We desire to state that in view of the special circumstances under which the enterprise of furnishing Vancouver with water was undertaken by our company; the paucity of the population of Vancouver when the undertaking was initiated, and the difficulties we have encountered in carrying it out; that our enterprise has resulted in an abundant supply of pure water on reasonable terms to the inhabitants of the city, and, as we believe and maintain, at a proper and efficient pressure for fire purposes, we are entitled to be dealt with by the municipality—now that they are anxious to acquire our works after they have commenced yielding us a revenue of some \$40,000 per annum—in the full and unrestricted sense of the terms provided for such acquisition by our Act of Incorporation.

But the terms of arbitration proposed to us by the Corporation are in our judgment so vague in some respects, that they would place in the hands of the arbitrators an indefinite discretion which might lead to conclusion by

them, (such for instance as provision for the construction of a reservoir at our cost) largely and most unjustly injurious to our interests, and these conditions the Corporation urge us to accept, with the alternative as we gather from the reports of recent proceedings in the Municipal Council of the initiation under their subvention of a competitive scheme of water service for Vancouver. We are decidedly of opinion that a competing water service would be in contravention of the spirit and the letter of our rights under existing Acts, and of the agreements made between us and the Municipality in this respect, but we are most averse to any contestation for the maintenance of those rights, appreciating as we do the disadvantages and prejudices to our business interests which such contestation might entail, and therefore while protesting against the injustice of our being required to give over to the Municipality, a property the actual present and prospective value of which is so considerable, on terms specially calculated to entail on our company the risk of deduction from capital, which we have in good faith and with the best means at our disposal, expended in securing a great benefit to the City of Vancouver, in full assurance that in any case we should at least be recouped such *bona fide* expenditure with the interest and bonus provided for in our Act of Incorporation, we will consent to enter upon arbitration on the basis in all respects of the last proposition made to us by the Corporation by your letter of the 11th inst., provided the terms therein stated be detailed in the following particulars:—

1st. "Actual Cost of Construction" shall include all outlay by the company which shall be established to the satisfaction of the Arbitrators as legitimate expenditure in the organization of the company, surveying, engineering, superintendence and conduct of management of the company's works.

2nd. The term "Cost of placing the works in a thoroughly efficient and proper order, capable of bearing all necessary pressure of water for use in the event of any fire within the city, and the cost of putting the whole system in

thorough repair, that may have been rendered necessary from the happening of accidents or otherwise, since the completion by the company" shall apply only to the company's works now actually existing, and shall not be held in any way to mean or to include any provisions for any additional, supplementary or substituted work that might be considered desirable or requisite to protect or strengthen and improve the existing works, or to complete or perfect the water system now existing.

I have the honor to be, sir,

Your obedient servant,

(Signed) JOHN IRVING,

President.

Then at a meeting of the City Council held on December 1st, 1890, the letter of the President of Vancouver Waterworks Co., dated Nov. 29, 1890, was read, and a motion passed as follows:

That the Vancouver Waterworks Co. having by a communication dated 29th November, 1890, agreed to accept the conditions upon which the city proposes to acquire their system of waterworks, as set forth in a letter addressed to the said company on 11th November, 1890, be it resolved that a committee be and is hereby authorized to have a formal agreement executed in accordance with the terms of said letter at the earliest possible date, the agreement to provide for the arbitration being commenced not later than the 15th January next.

It was admitted by the Council that the company had *practically* adopted the Council's own proposal, and now all that remained to be done was to get the matter in forward shape, so that the incoming Council could consummate the arrangement.

Then at the Council meeting held on 15th December, 1890, the committee appointed to have a formal agreement prepared recommended that the City Solicitor be instructed to

prepare an agreement to arbitrate between the City of Vancouver and the Vancouver Waterworks Co., on the basis of the resolution passed by the Council on Monday, November 10th, 1890.

At a meeting of the City Council, held on Dec. 2, 1890, the following resolution was passed:

"Be it resolved that the agreement drafted with reference to the purchase of the property, real and personal, of every nature and kind whatsoever of The Vancouver Waterworks Company by the City of Vancouver, be forwarded to the company with a request that it be duly executed by said company without delay, as by resolution of Council the arbitration is to convene by January 15, '91, and be it further resolved that the Mayor and City Clerk be authorized to sign same when returned, and affix the city seal thereto."

The following draft agreement, with covering letter from City Clerk, was accordingly forwarded to and received by the President of the Vancouver Waterworks Company:

DRAFT OF AGREEMENT.

This agreement made the _____ day of _____ one thousand eight hundred and _____ between the Corporation or the City of Vancouver who, for themselves, their successors and assigns, are hereinafter called the "Corporation" of the one part; and The Vancouver Waterworks Co. Limited, who for themselves their successors and assigns, are hereinafter called the "Company," of the other part.

Whereas by the Act of Incorporation incorporating the company, passed by the Legislative assembly of British Columbia, and entitled the "Vancouver Waterworks Co. Act, 1886," it is therein provided by the 35th clause thereof, that the Corporation, on certain considerations, and by giving a certain notice as therein mentioned; And whereas, certain doubts and differences have arisen as to the interpretation to be put on the word "value" used in the _____ line of the said 35th clause thereof:

And whereas the Corporation are desirous of acquiring the said works, plant and property of the company, at a reasonable and proper cost, and have consented to give the notice as provided for by the said 35th clause, upon the said company having agreed that the word "value" as used in the said 35th clause, shall be held to mean and to bear the construction as hereinafter set out, and that the arbitrators to decide on the value as mentioned in the said 35th clause, shall, in arriving at the price to be paid for the said works, be guided and bound by the construction agreed to be placed on the said word "value" by the parties hereto as hereinafter set out.

Now this agreement witnesseth that in consideration of the premises and in consideration of the company having agreed as hereinafter appeareth, the said Corporation has agreed to and doth hereby give notice of its desire to acquire the works and property of the said company as required by and set out by the hereinbefore recited 35th clause of the said Act, and in consideration thereof, it is mutually agreed and declared that in arriving at the value to be paid for the said works and plant, the arbitrators shall be guided by and it shall be obligatory on them to carry out the following course in arriving at the said value.

They shall first ascertain and determine the cost of construction by the said company of its said works, such cost to include all legitimate expenditure in organizing the said company, and the sums paid for surveyors and engineers during the construction of the said works, and the cost of all labor and material, not in any case to exceed the market value of the labor at the date of the employment thereof, and the market value of material at the date when the materials were supplied and at the place from where the materials were imported, with all legitimate charges, freight and duty added, notwithstanding any contract for the said labor or materials the company may have entered into, but not to include any cost incurred in the repairs of the works from time to time, from whatever cause the repairs may

have been rendered necessary, nor any fees paid to the directors for the management of the company's affairs.

They shall then ascertain and determine the sum necessary to place the said works as they at present exist in such order and condition that they shall be capable of bearing all the necessary and proper pressure of water for effectual use in the event of fire within the city of Vancouver, notwithstanding that the works do not now extend to the limits of the city of Vancouver, and the cost of putting the whole system in thorough repair, that may have been rendered necessary by accident or otherwise since the completion of the said works by the company.

After having ascertained these amounts, they shall deduct the sum required for such repairs, and the sum that shall have been arrived at as necessary to place the work at present in existence in such order and condition as to fit them to bear all the necessary and proper pressure of water for effective use in the event of fire within the limits of the City of Vancouver from the sum found as the cost of construction, and the difference, to which will be added twenty per cent. on such difference, and a sum sufficient to make up the ten per cent. dividend mentioned in the said 35th clause of the said Act, shall be the amount payable by the Corporation to the company for the system of waterworks, and all other property, both real and personal, of said company, in connection therewith, free from encumbrances, charges and liens, of whatsoever nature or description.

And it is hereby mutually agreed and declared by the parties hereto that the notice given by the said Corporation to acquire the said works is given and accepted by the said company, and the arbitration under the said Act shall be carried out on the above proviso and condition solely that the value of the said works and property as stated by the said 35th clause, shall be arrived at and ascertained by the arbitrators in manner hereinbefore appearing, and it is hereby declared that in every respect the arbitration shall proceed under the said Act, and the parties hereto shall facilitate the settlement of the matter with as little delay as possible, and the said company will at once proceed to arbitrate without waiting for the expiration of the year's notice as provided by the said Act.

And it is hereby declared and agreed that the arbitrators and umpire in their conduct of the reference, the examination of witnesses and in all other matters whatsoever shall be bound by the rules of procedure, and have the powers conferred on them as if this matter had been referred to their arbitration by an order of the Supreme Court of British Columbia.

The receipt of this draft agreement was duly acknowledged by the President in a letter to the City Clerk, stating that the draft agreement had been handed to the Company's Solicitor for settlement, in conference with the City Solicitor, in accordance, in all respects, with the terms of agreement set forth in the correspondence between the Corporation and the company.

The following letter was also addressed to the Mayor and Aldermen of the City of Vancouver by the company's solicitors:

VICTORIA, B. C., January 3rd, 1891.

To His Worship the Mayor and Aldermen of the City of Vancouver, B. C.

GENTLEMEN:—On behalf of the Vancouver Waterworks Company, who have handed to us the proposed agreement between the Corporation of the City of Vancouver and the company for the acquirement by the city of the company's works, with instructions to settle the same in conformity with the agreement arrived at by correspondence between the Corporation and the company, dated the 11th and 29th November, respectively.

We have amended the agreement in red ink so as to as exactly as possible follow the terms of the correspondence referred to.

In reference to the recitals we have limited them to the Act, and the correspondence, and have also recited the giving by the corporation of the necessary notice, which we think should be done by a separate notice, and not by incorporation in the agreement. We shall not insist on this opinion, however, if the corporation would prefer the method adopted in the agreement, as submitted, although we think ours the preferable plan.

We have also added to the agreement a proviso that the corporation shall pay the costs of the arbitration, if the award exceeds (\$211,000) two hundred and eleven thousand dollars, the sum offered; the company paying the costs if the amount awarded be not more than \$211,000, to which we presume there will be no objection.

If exception is taken to any of the amendments, we would suggest a conference, as is usual in such cases, between the counsels of the city and company.

We have the honor to be, gentlemen,

Your obedient servants,
(Signed) EBERTS & TAYLOR.

Subsequently, in consequence of notices of motion having been given at a meeting of the City Council held on January 5th, 1891, a Committee on Waterworks was appointed on January 12th, 1891, and on January 19th, 1891, Mr. J. M. Browning was requested to act as arbitrator on behalf of the city.

On January 26th, 1891, the Council received a communication from Mr. Browning, declining to act as arbitrator.

On January 19th, 1889, the Council instructed the City Clerk to communicate with the solicitor of the Vancouver Waterworks Company, asking him to meet the City Solicitor with a view to settling the agreement to arbitrate, and a meeting was accordingly held between the City Solicitor and the company's solicitor. Settlement of the proposed agreement is still pending.

In the British Columbia Gazette of 4th December, 1890, appeared a notice signed by the City Clerk of Vancouver, of the intention of the Council to apply to the Legislature for an amendment to their Act of Incorporation; and on the following 18th December, 1890, a notice signed by the President of the Vancouver Waterworks Co., to apply for an amendment to their Act of Incorporation, by repealing Section 35, was published in the *Gazette*.

In reference to this latter notice, the following letter was addressed by the President of the company to the Mayor and Aldermen of the City of Vancouver:—

VICTORIA, B. C., December 22nd, 1890.

To His Worship the Mayor and Aldermen of the City of Vancouver, B. C.

GENTLEMEN:—We have caused to be inserted in the *Gazette* and your local papers, a notice that we intend to apply to Parliament at the next session, for an Act to amend our Organic Act, by repealing section 35.

We wish it most respectfully to be understood, by your Honorable Body that the course we are pursuing is by way of no menace, but only in keeping with an arrangement made at the last session of the Legislature by which we withdrew a similar Bill to the one we now propose to place before the Legislature, on the understanding that if no arrangement was arrived at between the city and the company by the 15th December, 1890, the company would be at liberty to introduce the Bill and the Council would not oppose.

If the negotiations now pending between the city and the company as to the acquisition by the city of our works are satisfactorily settled, the proposed amendment to our Act could be withdrawn.

I have the honor to be,

Gentlemen,
Your obedient servant,
(Signed) JNO. IRVING,
President.

WATER WORKS ARBITRATION.

The First Session Held Tuesday—The Company Present Their Case.

The Arbitrators on the Water Works question began their labors Tuesday morning. Those present were Mr. Justice Drake, presiding as Third Arbitrator; Mr. J. M. Browning for the City, and Mr. Tilton for the Water Works Company. The City was represented by Hon. A. N. Richards and the City Solicitor, Mr. A. St. G. Hamersley, and the Water Works Company by D. M. Eberts, M. P., and E. V. Bodwell. Mayor Oppenheimer and Sir Joseph Trutch each occupied seats beside the counsel for the City and the Company, respectively. Mr. R. Fairclough was appointed secretary. The morning session was spent in discussing details of how the case should be conducted. It was decided that the Water Works Company should be made the plaintiff in the matter. They would be asked to put a price upon their works and property and then bring in evidence to substantiate their contention as to price. The City would then have an opportunity of producing rebuttal evidence to show what they considered the works worth.

The afternoon session opened at 3 o'clock and was occupied by Mr. Bodwell in presenting the claim of the Water Works Company. In a very clearly put address of two hours he sketched the line upon which the Company proposed to show the value of their works and property. He began by describing the works in brief. The system adopted, he said, was that of gravitation. It consisted of a dam on the Capilano River, the mains to the shore of Burrard Inlet, the submerged pipes across the Narrows, the mains through Stanley Park, under Coal Harbor, and through the City as far as Westminster Avenue, with the distributing pipes throughout the City. He quoted from an able paper by Mr. H. B. Smith, read before the Canadian Society of Civil Engineers to give a clear idea of the surrounding country and the nature of the works as a means of supplying water to the City. The different sections of the works were gone over separately and described in detail. These consisted of 13,530 feet of 22 inch mains to the tunnel; the tunnel was 280 feet long, 4 feet wide and 10 feet high. Between the tunnel and the north shore of Burrard Inlet were 19,320 feet of 16 inch mains. At high water mark the main was divided into two 12 inch branches, one of wrought iron, the other of cast iron. Of these 1,087 feet were submerged at low water mark and 2,140 at high water. From Burrard Inlet to Coal Harbor there were 1,041 feet of pipe, and 750 feet was submerged in Coal Harbor. From Coal Harbor to Westminster Avenue was 3,530 feet. The remainder of the works consisted of the cast iron distribution pipes within the City. There was now about two-thirds of the City supplied with a water service, while the works could have been supplied to the balance at this arbitration not being pending. Besides the mains there were 67 hydrants, as well as relief valves and air valves where required. Mr. Bodwell then touched on what should be taken into consideration by the arbitrators in determining the value of the works. That value, he argued, should be what they are worth in their present condition, taking into account their gross revenue and the cost of operation and management, (not that expenditure it might take to improve them to a certain standard or what the original cost of them may have been. Reviewing the history of the Company Mr. Bodwell pointed out that when the Company was organized the City of Vancouver was not then incorporated; its population was not 1,000 souls and it was not at all sure that it would become a great City. The Legislature had made provision to encourage those who had the enterprise and capital to undertake so difficult a work and had provided that the Company should be paid an advance on their expenditure when the City desired to buy the works from them. In considering the compensation the valuable franchise the Company possessed would have to be taken into account. The value of the works would be, not the cost of their construction, but what they would bring considering their adaptability to their purpose, the demand there is for the franchise, the quantity and quality of water, and the advantages of the system, should be taken into account in the computation and also the quality

of the water that had never been impounded, as to the supply it was estimated that the Capilano River without any improvements would supply 440,000,000 gallons of water per day sufficient for a population of 700,000 people. The system was by gravitation with a sufficient head of water to give a pressure of 85 pounds at the Hotel Vancouver and 140 pounds at low water mark. The works without any extensions would supply 3,000,000 gallons per day or sufficient for a population of 50,000.

Mr. Bodwell then entered upon a lengthy calculation of the value of the franchise possessed by the Company. According to an estimate of the *Economist* a London journal the franchise of certain water works companies in the vicinity of London was worth the revenue of 25 years and then 10 per cent should be added for enforced sales. The books of the Company showed receipts for the year ending May 31, 1891 to be \$38,503.12 and taking this as a basis he calculated that the value of the franchise of supplying water to the City of Vancouver with its certainty of growing so rapidly, would be at least \$1,875,000. He closed by urging that the Legislature never intended to transfer their franchise to the City for nothing and give the City power to purchase the works and property of the Company, and the term property he took to mean the franchise of the Company.

Mr. Justice Drake asked whether the Company proposed to ask the 10 per cent. profits on the paid up capital of the Company from the date of organization or from the time of commencing the work.

Mr. Bodwell asked for time to consider the reply.

Hon. A. N. Richards suggested that the Company's Solicitor present a detailed statement of what they valued the franchise at.

Mr. Bodwell then asked for an adjournment till 10 o'clock Wednesday when the accounts would be gone into.

The meeting then adjourned.

When the Water Works arbitrators resumed Wednesday at 10 o'clock, a. m., Mr. J. A. McFarland, Secretary of the Company, was called. In addition to those present on Tuesday, Mr. W. F. Salsbury, who had prepared an audit of the books of the Company, was also there. Mr. McFarland submitted a statement of the money paid out by the Company in the construction and maintenance of the works. This put the total cost at \$341,749.28, with sundry unadjusted claims amounting to \$1,500. Management and maintenance in 1889 amounted to \$6,653.11; in 1890, \$16,972.56; in 1891, to May 31st, \$41,845.27. Interest on overdraft amounted to \$4,906.27. The revenue for 1889 was \$12,898.75; in 1890, \$29,583.61; and 1891, \$16,718.73; total, \$59,201.09. The details of these amounts were also given.

In the cross-examination, Hon. A. N. Richards went into the subscriptions of stock and the amounts paid. The first subscription of stock, Mr. McFarland said, was all paid up. A second subscription was made in 1890 to extend the works. Two calls of 20 per cent. each had been made on this, but all had not been paid up. Captain Irving had not paid any of this second call, and he had never been sued nor his shares forfeited. Mr. Richards enquired whether Mr. Keefer had been given stock for his professional services, but the witness said he had paid in cash.

The purchase of the pipes was then gone into. Mr. Richards asked whether the pipes had been bought from Mr. Rithet.

Witness said the pipes had not been ordered through him from Great Britain; they had been bought from Mr. Rithet as they might have been from anyone not a shareholder. They had asked for prices from several firms, and found Mr. Rithet's the lowest. Mr. Justice Drake held that the only question was, whether the price was in excess of the market price.

In a statement of the finances of the Company, prepared by Mr. Salsbury, there were some pencil notes of sums paid for canvassing. These included \$135 to Mr. Smith, and other sums to Mr. Keefer and to Captain Irving. Mr. McFarland explained that this was during the time the Coquitlam Water Works scheme was before the citizens. Mr. Bodwell objected to any enquiries being made about those moneys; the sums had not appeared in the claim of the Company, and if the Company wished to spend their own money in that way, it was their own affair.

Judge Drake ruled that these sums should not be taken into account in making up the total, yet the questions were allowable.

Mr. Richards asked about another item of \$2,500 paid to Mr. Eberts. This was explained to be a solicitor's fee for securing the incorporation of the Company.

Turning then to the right of the Company to retain properties Mr. Richards asked if the Company had any legal right to build a dam on the Capilano River. Mr. McFarland said they had

nothing but the Act of the Legislature.

Mr. Richards—You have taken water from that river, have you any right by deed or title to the use?

Witness—Nothing but the Act of the Legislature.

Mr. Richards—Have you any deed or conveyance from the property owners below the dam giving you the right to abstract water from the stream.

Witness—I have no such document in my possession, I believe there is one coming.

Mr. Richards mentioned, the difficulty about the rights of property owners along the Victoria water works line and instanced the Victoria water works but Mr. Justice Drake submitted that in Victoria the stream was private property while here the Government gave the power.

Mr. Richards—Have you any grants from the owners of property between the dam and the Inlet granting permission to lay pipes across their land.

Witness—I have nothing in my office but the charter.

Mr. Richards—Have you any order in Council granting you the privilege of laying your pipes between high and low water marks on either side of Burrard Inlet?

Witness—There are none in my office. Mr. Bodwell—The deeds and those documents are in the Solicitor's office.

Mr. Richards—Have you any grant of the right to lay pipes across Stanley Park.

Witness—I have none.

Some of the items in the cost of construction and maintenance were then gone into especially that of the mains across the narrows. One break had occurred in June 1890 which had cost \$1,200 to repair. Another had happened in November of the same year when the supply of water was cut off for 10 days. During that time the Company had supplied the citizens with water brought from Moodyville and delivered by water carts. This was when the steamship struck the pipe line. The repairs had cost \$3,800. The Arbitration then adjourned for luncheon.

At the afternoon session the cross examination of Mr. J. W. McFarland was continued. The efficiency of the works was first gone into. The witness stated that the fire department of the City was now allowed to connect their engine with the hydrants for engineering reasons he could not deliver an opinion upon. Some relief valves and air valves had been put in previous to Mr. Schussler having made his report but more had been put on since. In 1889 about a mile of pipe had been taken up and replaced by new. This was done at the expense of the contractor. The first pipes had been procured from Mr. Rithet. In May, 1890, \$2,617 was spent in alterations between low and high water at the shore at Burrard Inlet. This part had never been repaired. The connections into the houses was built by the company the subscriber making a deposit, and the company repays this in reduction of the water rates. When the deposit is refunded the connection becomes the property of the company. There was still \$2,702 owing to subscribers. The total for services amounted to \$16,925 up to date. This sum Mr. McFarland had never been instructed to credit either to cost of construction or revenue; in his own opinion he would charge it to revenue as frequently persons would say, "I will give you \$10 to put in the water connection and not trouble with the refund."

Another item of \$684.89 was the subject of inquiry which Mr. McFarland said was for expenses connected with the time the alternative water works schemes were voted on by the City. The sum was included in the \$31,846.93 for construction. The item of \$1,000 for a report on the Capilano Water Works scheme paid to Col. Eckhart, was also brought up. The witness said the report was got to place their case before the citizens of Vancouver. It was also brought out that an item of \$170.15 for office expenses was made up for board and wine at Hotel Vancouver, dinners for 34 aldermen and citizens and a ticket to the Board of Trade banquet for Capt. Irving. These expenditures took place upon the opening of the water works. The next sum enquired about was that of \$9,000 credited to the directors. Mr. Richards asked if there was a resolution of the shareholders to authorize that payment. Mr. McFarland then turned up the minutes of the meeting of the shareholders on May 20th, 1891. Those present were Capt. Irving, Sir Joseph Trutch, Mr. Rithet, Mr. Eberts and Mr. McFarland. Mr. G. A. Keefer and Mr. Earle were represented by proxy.

Mr. Richards—Who are the directors of the company?

Witness—Sir Joseph Trutch, Captain Irving, Mr. Rithet, Mr. Earle, Mr. Eberts and Mr. Keefer.

Mr. Richards—There was only yourself then who was not a director?

Witness—Yes.

Mr. Richards—But this was a meeting of shareholders?

Witness—Yes.

Mr. Richards—And they voted the directors \$9,000 for their services since the inception of the company?

Witness—Yes.

Mr. Richards—I suppose they had no difficulty in passing the resolution. Did the directors meet afterwards?

Witness—They met next day.

Mr. Richards—And proceeded to carry out the wish of the shareholders?

Witness—No resolution was passed. The money has never been paid.

In answer to further questions Mr. McFarland stated that the first directors, who were Sir Joseph Trutch, Captain Irving, Mr. Earle, Mr. Rithet and Mr. Eberts, were elected October 15th, 1887. Later on Mr. Geo. A. Keefer was added; his position as engineer ended when the water was turned on in 1889. No dividends had ever been paid. The only transfers of stock was 50 shares from Mr. Keefer to Mr. Aikins, of Victoria. He did not know the price paid; the stock had never been in the market.

Mr. Herman Schussler was called before Mr. McFarland's examination was concluded, that he might return to San Francisco on Friday. He stated that he had been an engineer on the Spring Valley Water Works of San Francisco since 1864; until 1866 as assistant, and afterwards as chief engineer. During that time he had had considerable experience in laying both submarine pipes and those on land. The Spring Valley Works included both the gravitation and pumping systems. He had been employed by the Vancouver City Council to make an examination of the Vancouver Water Works about a year ago. He had done that as thoroughly as he could under the circumstances. He had caused the pipe line to be uncovered at various places, so as to get a pretty good idea of its condition.

Mr. Bodwell objected to any evidence being given as to the condition of the works a year ago. The question was the condition of the works now.

Judge Drake ruled that the works would not be apt to improve during the year, unless someone worked on them. The evidence was admitted.

Mr. Richards proposed to submit Mr. Schussler's report sent into the City Council last Summer, but Mr. Bodwell objected on the ground that the Company were no party to the engagement of Mr. Schussler. It was decided that Mr. Schussler should be examined on the lines taken up by the report. He then went on to describe the works minutely, in about the same terms as those used in the report. He had been afforded every facility by the Company to make the examination. His evidence was mostly of a scientific character, dealing with the proper construction of works, and the placing of safety and air valves to provide against accident. He had seen none of these safety valves upon his visit last year but now he had found quite a number. The pipe line for the most part, he found constructed of strong material. As to the cause for the Company's refusing to allow the fire engine to be attached directly to the hydrant he said the sudden withdrawal of the water would produce a vibration motion in the hydrant and adjoining pipe causing danger. Were the City large with a greater number of cross pipes this effect would be greatly obviated. The engine used by the fire department was single acting, much harder on the hydrant than a double acting engine.

At 5:30 an adjournment was taken till 10 a. m. Thursday when the examination of Mr. Schussler will be continued.

The Water Works arbitration resumed Thursday at 10:30 when the examination-in-chief of Mr. Hermann Schussler was continued by Hon. A. N. Richards. Mr. Richards desired to question Mr. Schussler as to the location of the pipe line across the Narrows with the view to showing that it was a bad one, apt to be destroyed at any time, and consequently of less value than if properly located. Mr. Justice Drake ruled that the question to be decided was the value of the works as at present constructed and not, as to the merits of an alternative system. The quality of the material of the pipes was then gone into. The witness stated that the cost of steel pipes, pound for pound, was much less than of cast iron, but considering lightness in transportation, foot for foot they were cheaper. The steel pipe should be coated by boiling in an asphaltic mixture. A year ago he had found the asphaltic coating very poor, while the steel of which the pipe was constructed was of exceptionally good quality. Upon examining some of the pipes this year he had found that it had suffered no deterioration during the year in spite of the poor coating, and he had complimented the officers of the company upon the excellent way in which they had preserved their pipes. With steel pipes, Mr. Schussler said, the trouble was that the "mirror" face which was always on the steel was apt to chip off with the coating leaving the steel bare. Mr. Schussler then described the care taken by him in laying a submarine pipe across

San Francisco Bay, that the costing should not be scraped off. The pipes had been put together on a barge and lowered carefully to the bottom. He would have advised the pipe across the Narrows to be laid about half a mile distant from where it is. Even at the amount this company paid per foot, he would prefer to lay it at another location. The cost of laying the submarine pipe at San Francisco was about \$2.50 per running foot. In the location suggested by him the barge used by him in San Francisco could be used here and without impeding navigation. A three-inch cable was stretched from shore to shore and the barge moved along this. The cable was kept to the bottom by leaden weights so that steamers and sailing vessels passed at all hours of the day and night. The pipe across Coal Harbor he found this year to be a first class one. It was of steel, with ball joints. This was a new one put in since last year. The cast iron pipes were well laid, but, perhaps, a little too close to the surface in some places. There was one steel main in the City, running along Georgia, Granville and Hastings streets, to Westminster avenue. It was now in good condition. The ditches were too shallow, and heavy weights passing over would be apt to injure. He had estimated the cost of the works at \$251,031.33.

Mr. Richards asked if that cost should not produce better works than he saw there.

Mr. Bodwell objected to the question. Mr. Justice Drake ruled the question out as not evidence and as one upon which the witness from his professional work as an engineer only would not be in a position to state.

Mr. Richards contended that as there was no appeal from the decision of the arbitrators, greater latitude should be allowed in the nature of evidence taken, and no objection taken without the authority being shown for such objection.

Mr. Richards asked Mr. Schussler what was the value of the additional work that has been done since he made the report, but this question was objected to by Mr. Bodwell. Mr. Schussler stated that the pipe which had been replaced was valued at \$3,700. The cost of the improvements they had made was about \$7,000. He had been informed that about 30 air valves at a cost of \$20 or \$25 each; nine safety escape valves had been put in at a cost of about \$300 each; some strapping had been done to the joints, which should have been done when the pipes were laid, but he could not estimate the cost. The new steel pipe across the Narrows had been laid since he made his report. Considering the duty and the higher rate of wages here than in San Francisco, he thought \$10 a running foot should have covered everything. Their pipe in San Francisco had cost \$4 a running foot, putting on the wells and nipples \$2.50 a foot, and labor \$3 a foot. This was for a 16-inch pipe, 5-16 inch thick while this one was only 12 inches in diameter and 1/4 inch thick. There was about 2,250 feet in all. If there were 1500 feet between low water on either side, and 1000 feet between high and low water on both sides, this latter being worth but \$7 a foot, all the improvements put in since he made his report, excepting those in the City distribution system, would be estimated at \$27,125. Mr. Schussler had advised in preparing his report to leave this cast iron pipe out of all account, as it was in so dangerous a condition. He would deduct the cost of it from the total. While the old cast iron pipe remained it would do a little good, but putting himself in the place of the purchaser, he would not put any value on it. The estimate of the value of the pipe across Coal Harbor, 350 feet, at \$8.50 or \$2,975, should be deducted from the total of last year's estimate. Taking his estimate of last year and adding the cost of the improvements and deducting the cost of the parts announced, it would bring his estimate of the value of the works to \$265,403.33.

Mr. Richards asked that the diver's evidence be now heard, in order that Mr. Schussler may give his opinion as to the value of the submerged pipes.

Mr. Bodwell objected on the ground that the case was being conducted irregularly. If the City had gone on with their side of the case from the first, it could be all right to call the witness now.

Mr. Drake upheld the contention of Mr. Bodwell. The diver could only state what he saw, and the arbitrators would be able to draw their own conclusions.

Mr. Richards wanted the benefit of Mr. Schussler's long experience in estimating the cost.

Mr. Browning submitted that the idea was to get at the bottom of the facts, and under the circumstances he thought the irregularity might be permitted.

Mr. Tilton thought it was decidedly very irregular.

It was finally decided that the diver should be heard with the understanding that no other witness should be interpolated during Mr. Schussler's examination. The adjournment was then taken.

At the afternoon session Salve Thorson, the diver, who had examined both the steel and the iron pipes across the Narrows, was the first witness called and examined by Mr. Hamersley. He began to examine the submerged pipe from the south end. For 130 feet from the south shore he found a clay bottom, then came 429 feet of rocky bottom, with boulders from 2 feet to 5 feet high. There was next 572 feet of gravel. Among the boulders the pipe was often out of the straight line at the joints; one joint he found two feet out of line. The steel pipe was partly covered with mussels and barnacles. Among the gravel the pipe was bright like polished steel. He found a break in the pipe 135 feet from the north shore. This had been repaired by a steel sleeve put over the pipe fastened by lead joints at either end and the two lengths of pipe held together by chains. He found two small leaks, one about 1-16 inch wide and inch long at the lead joint. Otherwise the repairing was well done. On the clay the pipe was straight and overgrown with mussels and shells. Upon the rocky bottom there were places of from 12 to 20 feet where the pipe was suspended without touching the bottom. The iron pipe was in the same condition as the steel one in this respect. There was a little rust around the joints. There were three patches on the iron pipe; the first 195 feet from the north shore. This was mended in about the same way as the other, but no bell joint was put on. There was one leak in the sleeve near the top, but only small. The next patch was 325 feet from the north shore. Two-thirds of the pipe was buried and 13 clamps go over the break which seemed to be semi-circular. The break was about 7 feet long. There was a leak at either end. From one of these he could feel the force of the escaping water for 3 feet. The leak was 2 inches long and 1-16 inch wide. He did not see any lead in that patch. The other leak was very small. There was another break 520 feet from the north shore. It was about 9 feet or 10 feet long on the top of the pipe with 32 clamps on it. They were only a short distance apart. There was only one leak on the under side. There was no paint on it. He thought the sand and gravel washing on the pipe kept it bright.

Cross-examined by Mr. Bodwell, Mr. Thorson said the repairing on the steel pipe was as well done as a man could do it under water. He found only one place where there was 20 feet of the pipe not resting on a rock. In the cross-examination Mr. Thorson stated scarcely anything he had not stated in the examination in chief.

Mr. Schussler was recalled, and his examination was conducted by Mr. Hamersley. From what he had heard the diver say, he was still confirmed in the opinion that the cast iron pipe across the Narrows should not be taken into account in estimating their value. The works could be constructed now for the price he had put upon them. The cost of the maintenance and operation would be likely to keep on at about the same rate. The sum fixed in the Company's statement was rather heavy, and in works of this nature must necessarily be heavy, owing to the submerged pipe. Mr. Hamersley asked whether the pipe, where laid along the side of the hill, was apt to get out of repair and occasion additional cost of maintenance in the future. This question was ruled out as referring to the future. The pressure on the pipes, Mr. Schussler said, was too high for their state. By bringing the pressure down to the level of the pressure tank, about 250 feet, and with a better distribution system, the works could be used for fire protection purpose. If he had charge of the system he would not have more than 110 pounds of pressure. He thought it fair to deduct about 5 per cent. for depreciation in value. It was usual to allow about 10 per cent. in the pumping system. If the works were all above ground, about 3 or 4 per cent. would do, but from 5 to 7 per cent. would be about right for these works.

This ended the examination in chief of Mr. Schussler. Mr. Bodwell refused to begin at once with the cross-examination, and the meeting adjourned till 10 o'clock Friday morning.

At the opening of Thursday's session a copy of the agreement as to the cost of the arbitration between the City and the Water Works Company was filed. By it if the City refused to purchase the works at the sum fixed by the arbitrators they are to pay all costs and if they purchase the costs will be evenly divided between the two parties.

Among those present Thursday were Mr. Justice Drake, Mr. J. M. Browning, Mr. E. G. Tilton, Mr. Bodwell, Mr. Eberts, Hon. Thos. Davis, Mr. Hamersley, Hon. A. N. Richards, Mayor Oppenheimer, Sir Joseph Trutch, Geo. A. Keefe, Hermann Schussler, Col. Isaac L. Smith, Alan Macdonald, J. W. McFarland, Capt. Irving, J. F. Garden, F. C. Cotton, Dr. Lefevre, W. Crickmay, W. B. Smellie and R. Fairclough, secretary.

Among the papers put in at Thursday's meeting was a detailed statement of what the Company consider to be the value of their works and property. The following is a copy:

THE COMPANY'S CLAIM.	
Estimated value of works and property of the Company	\$2,000,000 00
Estimated value of Company's franchise on basis of 25 years' purchase	
On present income and present distribution service without reference to increase of population	
Gross revenue for year ending May 31st 1891	\$93,509 12
Amount of this revenue for 25 years	907,928 00
Deduct cost of operation at 10,000 per year	250,000 00
Balance	\$657,928 00
On present population but with distribution service extended over whole of City	
Estimated revenue for 1892 on this basis	\$50,000 00
Total revenue for 25 years	1,250,000 00
Deduct for operation and maintenance	250,000 00
Balance	\$1,000,000 00
Assuming that population at end of 25 years will be two and a half times greater than at present	
Estimation of value without extended distribution service over portion of City not now covered	
Income at end of 25 years will be two and one half times present, that is, two and one half times \$93,509.12	\$90,773 00
Mean income for 25 years will be	1,589,525 00
Deduct for operation and maintenance \$12,500 a year for 25 years	312,500 00
Balance	\$1,277,025 00
Assuming population will increase two and one half times present and that present income if distribution service extended over whole City would be \$50,000 per year	
Income at end of 25 years will be two and one half times \$50,000	\$125,000 00
Mean income for 25 years will be	2,187,500 00
Deduct for maintenance and operation \$12,500 for 25 years	312,500 00
Balance	\$1,875,000 00
Assuming present income should be \$50,000 a year if distribution service extended	
Gross income	\$50,000 00
Deduct operation and maintenance	10,000 00
Net revenue	\$40,000 00
Which is equal to 5 per cent on \$800,000.00	
Assuming income will increase two and one half times in 25 years gives mean annual income	\$87,500 00
Deduct operation and maintenance	\$12,500 00
Net income	\$75,000 00
Which is equal to 5 per cent on \$1,500,000.00	

At the Water Works arbitration Friday the cross-examination of Mr. Schussler by Mr. Bodwell was begun sharp at 10 o'clock. The first questions related to the capability of the iron and the steel pipes across the Narrows to withstand the pressure upon them. Under the peculiar circumstances in which the pipes were laid, he considered the safe pressure would have to be well within the elastic limit of the material owing to the difficulty in repairing should a break occur. He would advise the lowering of the pressure to 115 pounds per square inch. A 12-inch pipe, cast iron, 23-32 inch thick, capable of a pressure of 2,000 pounds, would stand an inward pressure of 225 pounds under water. If the cast iron pipe were cut off the steel pipe, if properly laid, would endure the present pressure. The two 12-inch submerged pipes with the present gradient of the main on land would be required to carry the water brought by the 16-inch main. If more water were used there would not be so high a pressure on the pipes.

Turning then to the conditions under which Mr. Schussler had prepared his report last year, Mr. Bodwell asked if his instructions in preparing the report was to compare this system with some other mode of water supply. Mr. Schussler said he had considered its cost to construct as compared with a system wholly on land. He had not taken a pumping system into consideration. Supposing the Company has the right to use the water of the Capilano River he thought the supply very ample indeed. He had seen the Lock Kaituma system for Glasgow and the two were much alike. He had looked down the valley at the Capilano but considered it poorly adapted for a storage reservoir. The available quantity was perfectly capable of supplying the City of Vancouver for many years to come. He was told that a thousand million of gallons per day pass the dam which would supply a very large population.

Mr. Richards objected to all questions relative to prospective value. He had raised the objection at first and proposed to do it now. The question was the value at the present day and he was opposed to a value for the franchise being considered.

Mr. Justice Drake thought the Company could advance the argument and the arbitrators could not very well refuse to receive it.

Mr. Hamersley called the attention of the arbitrators to the fact that on Thursday evidence offered by him bearing on

prospective cost of repairing breakages likely to occur had been ruled out.

Mr. Bodwell said the objection taken by him was against evidence as to prospective maintenance when present maintenance was the question before the Board.

Mr. Richards—You want prospective value and present maintenance.

The relative advantages of a gravitation and a pumping system Mr. Schussler testified depended on circumstances. If the gravitation system required the laying of pipes through a locality where they would be difficult to maintain it would detract from its value, and in some cases the pumping service was preferable. Mr. Bodwell to get the relative cost of maintenance, asked what pressure the witness considered sufficient for domestic purposes. This was given at about 60 lb per square inch. For fire protection about 95 lbs. was required. To give this additional pressure an additional cost with a pumping system would be required. With the gravitation system there would be no extra cost, except the increased pressure would endanger the safety of the pipes, in which case the pumping system might be cheaper. Parallel streets with parallel mains required cross connections. One benefit to accrue from these cross connections would be to enable the fire engines and hose to be attached directly to the hydrants. If a shock occurs and the safety valve is not within say half a mile, the pipe may be broken before the shock reached the safety valve. Coming back to the question of the morning, Mr. Schussler said that if the kalameine pipe was broken and the cast iron one not, the latter was of value. He could not tell the probable life of the cast iron main as at present laid. Fourteen years might not be out of the way, but he had had no experience in the matter.

Mr. Bodwell asked the witness if he would be surprised to learn that cast iron would last 50 years under water. Mr. Schussler thought he would. He would be surprised if it lasted 20 years.

Mr. Schussler's cross-examination by Mr. Bodwell was continued at the afternoon session. As to the position of the main across the narrows the witness gave his reasons for advising that the main should be laid at another position from which it is. He would, however, have sent down a diver to examine the nature of the bottom, and would have observed the currents closely before finally advising the main to be placed in that situation. As to his proposition of stretching two chains across the channel, one on either side of the pipe line, Mr. Schussler said that if an anchor caught on that chain it would likely stay there and the cable part before it would be taken up. He did not know what the marine authorities would have to say about his putting down such a chain.

The coating of the pipes was next the subject of the examination. Mr. Schussler said that the asphaltum coating of the pipes here was porous, and apt to fall off. He could not state what ingredient it lacked. When asked by Mr. Bodwell what ingredients he used in his asphaltum coating, he said that that was some information he usually sold for a large sum. The Kalameine coating of the steel pipes was supposed to form a compound with the steel rendering it impervious to rust, but the pipes should also be treated with the asphaltic preparation.

The arbitration adjourned for 10 minutes to allow of a meeting of the Directors of the Water Works Company to affix their seal to the agreement with the City to the arbitration.

On resuming the amount of the rust and the quality of the coating was gone into. In the eight cases mentioned in Mr. Schussler's report of the condition of the pipe, Mr. Schussler said he had scraped the coating off himself; he was anxious to see if, considering the porous nature of the coating, there was rust under it. He had not examined the books of the Company to ascertain the cost of the works Mr. Bodwell submitted a detailed comparison of Mr. Schussler's estimate of quantities and values, with what actually appeared on the books kept by Mr. Smith, engineer in charge of construction. In one amount of excavation for a pipe, the estimates of Mr. Schussler and Mr. Smith had differed by about 5,000 yards. Mr. Schussler stated that he had the profile furnished by the Company, and after a liberal allowance he considered his estimate pretty nearly correct.

Mr. Bodwell—The amount of excavation was 5,000 yards more than your estimate; does that surprise you?

Mr. Schussler—That does not prove my estimate wrong.

Another item was a difference of some 40,000 pounds in the weight of a portion of the piping. Mr. Schussler maintained that if he had been given the proper distance by the Company, and the correct size of the steel his calculation was not out of the way. The Company, he thought, must have weighed the rivets, nipples and cement. Some other smaller differences between Mr. Schussler's and Mr. Smith's figures were brought up, and with that the cross-examination closed.

Re-examined by Mr. Richards, Mr. Schussler stated that the breaks could hardly be repaired so as to be as strong as before. The method of putting in the pipes, by fastening them together on shore and dragging the line across by an engine was apt to weaken the joints and scrape the coating off the pipes. His method of preparing the estimate of the excavation he thought fairly accurate without having the cross sections. The cost of laying the pipe from the barge as done by him in San Diego and San Francisco harbor was not very expensive. He had got his lineal measurements used in compiling his report from the office of the Company. Mr. J. W. McFarland, Secretary of the Company, was recalled. He handed in a statement of the dealings of the Company with Welsh, Rithet & Co. and of the payments of the Company to Mr. Keefer. Mr. Richards stated that he did not wish to examine him any further and his evidence was consequently closed. Mr. Justice Drake asked Mr. Eberts for the Company to produce all the deeds and ties they had to the right of way for the whole distance of their works. It being 4:30 o'clock it was not thought advisable to begin the examination of a witness and an adjournment was taken at 10 o'clock Saturday.

Mr. J. W. McFarland, Secretary of the Water Works Company, was recalled Tuesday morning, and his cross-examination continued by Mr. Hamersley. The contract between the Company and the Albion Iron Works was first gone into. The Albion Iron Works had made the pipes and laid them, the Company supplying the steel plates, all joints and air valves. The 16-inch pipe cost \$1.25 delivered on Capilano Wharf, or \$1.48 laid in trench, and all the joints guaranteed. The 22-inch pipe cost \$1.72 $\frac{1}{2}$ laid on Capilano Wharf, and \$1.90 laid, but the prices did not include distributing the steel for the pipes had been purchased from Rithet & Co., but witness said the invoices had never been checked. They knew the thickness of the pipes, and took the engineer's certificate in the required quantity had been supplied. He had the shipping bills and invoices. Duncan Bros. of London, had been asked to tender for supplying and laying the pipes, but the only other person spoken to were the Albion Iron Works Company. Col. Eckhardt had made a report upon the water works, but witness had no copy of it. Mr. Bodwell promised to furnish a copy if he could find one. Copies of the contracts of the Albion Iron Works, Rithet & Co. and Ward & Co. were also promised. The distribution pipes were furnished by the Company, and put in by day labor. Superintendent's certificate was then for the amounts. The air valves were supplied by the Albion Iron Works, and were ordered as anything else might be. This closed Mr. McFarland's cross-examination.

Mr. Bodwell then offered to put in a copy of Col. Eckhardt's report, but Mr. Hamersley objected till it should be given.

Re-examined by Mr. Bodwell, Mr. McFarland testified that the contract for supplying and laying steel pipes had been let to John F. Ward & Co., of Vancou City, at \$9 per running foot, but had never completed his contract, and was re-let to Keefer & McGillivray by order.

Mr. Bodwell then suggested to call Mr. Smith, but on second thoughts decided to have the diver called, as he did not want to be keeping him at \$30 per day when he was not diving.

Mr. Justice Drake—He is more costly in an arbitrator.

The diver could not be found, and Mr. C. B. Smith, C. E., was called. His connection with the water works, he testified, began on December 2nd, 1885, when he left Victoria to make an exploratory survey of the course. He had ten men engaged. About June 20th, 1886, a few days after the great fire, he made a trial survey, and afterwards prepared a profile of the country. This trial survey took a month in the field and about three weeks in the office. He had a leveller and six men. No maps or records of the survey could then be obtained, so that the work was difficult. He gauged the river at the point at which the dam was built. The river showed 448,000,000 American gallons for 24 hours. This calculation was taken at as near the lowest water mark as he could get. He had never observed the water lower in the river, but very seldom.

Mr. Smith produced profiles of the works and the construction surveys with the cross sections. The works consisted of a 22-inch main from the dam to the tunnel, 16-inch main from the tunnel to the narrows, two 12-inch mains across the narrows, and 16-inch mains from Stanley Park to Westminster Avenue. The dam, he witness thought, had been placed in the most advantageous place. The nature of the country from the dam to Burrard Inlet was described. As to the position of the pipe line across the Inlet witness said soundings had been carefully taken from Cambie street to the present loca-

tion across the Narrows. In 1886, a distance eastward from the present position was considered, and very carefully sounded. No diver was sent down, but a profile was prepared. There was about 66 feet of water at low water. The line adopted is materially shorter, the bottom more uniform, the depth of water less, the chances of ships anchoring less and the cost materially less.

The Company's diver by this time had arrived and Mr. Hamersley suggested that he be called now, as the City was keeping Mr. Thorson till the other should have been called, and he could leave for San Francisco at 1 o'clock.

Mr. Bodwell said he had called Mr. Smith now and he did not propose to interrupt his examination or to call the diver just at present.

Mr. Smith said the contract for clearing on the north side of the Inlet was let to Stevenson & McCraney, and finished in January, 1888. John F. Ward had the contract for laying the pipes, but he only put down ten lengths. The contract was then let to Keefer & McGillivray. They began by taking up the pipes Ward had laid. They put the pipes together on longitudinal skids, each length was tried by a pressure equal to 300 pounds to the square inch produced by filling the pipe with water and applying a steam pump. Each length was struck a blow with a heavy sledge hammer to ascertain whether there were any flaws that the pressure test did not reveal. Any pipes found imperfect were rejected. The forward end of the pipes was protected by a cast iron nozzle and cedar logs, then the whole pulled across by the steel cables. The pipe began to move about 10 o'clock in the morning and at 6 o'clock it was in place. Next morning it was tested with the steam pump and examined by Diver Llewellyn. As to the coating of the pipe he thought it fairly plastic. Where it had been scraped off by accident it was painted again. The line in Stanley Park and through the City was built under the Superintendent's charge. He had examined the works last year to report to the Company as to how to get the greater pressure which the city had been asking for. He had tested the hydrants in the city on June 24th, 1891, with the following results. At the Company's workshop, 118 pounds; corner of Hastings and Columbia Avenue, 116 pounds; corner Hastings and Georgia, 99 pounds; shore Coal Harbor, 145 pounds; at Hotel Vancouver, 69 pounds; Georgia and Pender relief valve, no pressure needed; north side Narrows, 130 pounds. The capacity of the present works he estimated at 3,266,261 American gallons per 24 hours. The utmost limits of tensile strength of the 22-inch main is 12,000 pounds per square inch, as per contract, he had not tested them himself. The factor of safety was about 5 for steel, 6 for wrought iron, and 8 or 10 for cast iron.

At 12:40 the arbitration adjourned till 8 o'clock in the evening to allow those who wished to attend the lacrosse match.

Some minutes after the adjournment the arbitrators resolved to hold an afternoon session, as the room in which they met was not suitable for doing business in the evening. They consequently resumed shortly after 2 o'clock, when Mr. R. Llewellyn, the diver employed by the Company, was called and examined by Mr. Bodwell. He testified that he had examined the cast iron sub-marine pipe both before and after it had been pulled across the Narrows. He had begun the examination after it was laid at the south end and followed its course closely. Where the bottom was rocky he found the pipe in good condition and settled between the rocks. It would not be difficult to repair where the rocks were, as the flanges of the joints kept it off the bottom and there was no deposit upon it. He had also examined the steel pipe after it was pulled across. It was laid under the same conditions as the cast iron pipe and subjected to the same pressure of 300 pounds to the square inch. It was in no more dangerous position than the cast iron pipe. He then explained how the breaks had been repaired in the two pipes: That in the steel main they had a sleeve of steel put over the break with rubber beneath, then 13 clamps put on and bolted down tight. He considered that part of the pipe stronger than the remainder. The steel pipes when drawn across were in a good position, and after an examination he had found nothing wrong. Upon his last examination he had found five small leaks. He was now familiar with the Narrows for about 3 $\frac{1}{2}$ years. He would not consider it easier to get at the pipe if it were 2,000 feet further east than it is. There would be no difference in the strength of the currents in the two locations. As to laying the pipe from a scow he did not believe it practicable on account of the current as he had seen a small boat drawn under by the force of the rising tide when he was working at the last iron pipe, the boat had been tied to a buoy.

Mr. Richards then took up the cross-examination, but nothing of importance was brought out different from what had been mentioned in the examination in chief. As to the places where the pipe was suspended between the rocks, he stated there was one place rather bad. There were other slight curves in the pipes, but he did not think them of sufficient consequence to make a note of their number. The pipe, where it lay between the rocks, could be easily repaired.

Mr. H. B. Smith, C.E., was recalled to prove a statement that had been put in as evidence. It showed the amounts actually paid out by the Company as compared with what Mr. Schussler had estimated the cost of construction at.

The arbitration adjourned shortly before 5 o'clock till 10 o'clock on Monday morning.

The Water Works Arbitration resumed on Monday morning shortly after 10 o'clock when the examination of Mr. H. B. Smith, C. E., was continued. The original plan, he testified, provided for the necessary cross section throughout the distribution system. He had made observations as to the strain upon the several lengths of the pipe when the main was hauled across the Narrows. Two steel cables had been fastened to the first length and carried forward to the engines on the south shore; another cable was fastened quarter way back, another midway between the ends. These were carried forward to engines on the south shore. A manilla hemp cable was attached to the rear length and carried to an engine on the north shore. According to his calculation when the pipe began to move and before it touched the water the strain on the first length of pipe was 5 $\frac{1}{2}$ tons; a quarter way back, 5 $\frac{1}{2}$ tons; midway, 5 $\frac{1}{2}$ tons; three-quarters way back, nothing; and on the rear length there was a pressure forward. When the pipe was half submerged in water the strain on the first length was 2 $\frac{1}{2}$ tons, quarter way back, 2 $\frac{1}{2}$ tons; midway, 11 tons; three-quarters way back, 5 $\frac{1}{2}$ tons. When the pipe was three-quarters immersed the strain was 2 $\frac{1}{2}$ tons on the first length, 8 tons in the centre, and three-quarters way back 5 $\frac{1}{2}$ tons, and when the pipe was wholly immersed the strain on the first length was 2 $\frac{1}{2}$ tons; quarter way back 2 $\frac{1}{2}$ tons; midway, 4 $\frac{1}{2}$ tons; and three-quarters way back, 2 $\frac{1}{2}$ tons. He thought this strain would be beneficial rather than otherwise, as it would render the lead more compact; the hauling would not hurt the lead filling unless it were pulled off altogether.

Cross-examined by Mr. Richards, Mr. Smith said he had received his commission as an hydraulic engineer from the Dominion Government in 1872 but he had been engaged in the construction of no other city water works than these. As to the amount of excavation, the quantity of earth removed was not measured but he satisfied himself that enough was taken out to give the pipes sufficient covering.

Mr. Richards stated to the arbitrators that he contended that too much excavation was to be done whether it was all done or not was another question. The only estimate of the quantity of earth to be removed could be got from the cross section. The trenches for the 12 inch main were to be 3 feet 6 inches deep, for the 16 inch pipe 3 feet 10 inches and for the 22 inch pipe 4 feet 3 inches. He satisfied himself that the trench would give a covering of 2 feet 6 inches over the pipe without heaping the earth up, and he had tested the depth with a blunt steel rod. The contract with Keefer & McGillivray was for a lump sum. His estimate had been \$42,000, while they took it \$36,000. He had never measured the tunnel to ascertain that it was up to specification; he was satisfied that it was sufficiently large to allow the pipe to be easily worked at. As to air valves there were air valves in the pipe when the water was turned on; there was one above the tunnel, one below and several others. Speaking of the turning on of the water in the first instance Mr. Smith repudiated the report of his paper on the Vancouver Water Works, read before the Canadian Society of Civil Engineers as a misprint.

Mr. Richards—Mr. Sommerfield found considerable fault with your method of turning on the water.

Mr. Smith—And I think I answered him conclusively.

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Mr. Smith—His paper is there and you can read what he says himself.

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While he was giving his evidence, Mr. Smith had refreshed his memory from a

book of accounts he kept before him. Mr. Richards asked how this book had been prepared. Witness said he had prepared the book from estimates in his office for the private use of Mr. Keefer. Mr. Richards then turned over the leaves of the book, and remarked that it was all written in the one kind of ink and in the one hand. Mr. Smith said he had written it himself.

Mr. Richards—It was not prepared to be brought into Court?

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The comparative estimates prepared by Mr. Smith and Mr. Schussler were next gone into in detail, the witness being examined by Mr. Hamersley. Of the 22 inch pipes, there was 13,762 1-10 feet weighing 23,294,876 lbs. per running foot. These figures were prepared by calculation only. The number of pounds of steel really delivered were from the invoices only; he did not know whose invoices they were. This gives the total of 389,114 lbs of steel plates. This did not include rivets, bands or lead. He knew from hearsay the cost to the Company was 2.7-10 cents per lb. delivered in Victoria. The contract of the Albion Iron Works was for 70 $\frac{1}{2}$ cents per lineal foot of the 22-inch pipe. He had never calculated the cost by the pound. The arbitrators, Mr. Smith and the counsel, then began to figure to get the cost of the pipes per pound of Mr. Smith's statement. Mr. Smith said there were other charges on the pipes in Victoria besides those given in the invoices. He thought Mr. Schussler's estimate must have included the weight of the pipes with the asphaltic coating. All parties gave up the attempt to reduce Mr. Smith's figures to a rate per pound. The other expenses which the witness said he knew there were, could not be named by him. The contract with Rithet & Co. called for the plate of which the pipes were made to be delivered at Victoria. He did not know whether that meant at the wharf or at the Albion Iron Works. There would be a part of the steel plates lost in the trimming required to make them into pipes.

The cross-examination of Mr. Smith by Mr. Hamersley was continued at the afternoon session. The details of the pipes for the mains was gone into again. Mr. Smith gave the following statement of the number of pipes used. There were 786 lengths of 16 inch main, and 6 not laid, on the north side of the Narrows, and 707 lengths on the south side with 3 not laid. There were also 12 lengths of 10 1-2 inch, each and 12 lengths of 5-7 of the ordinary size. There were 575 lengths of 22 inch mains, 59 lengths of 12 inch pipes, 23 feet 9 3-5 inch long, and 2 lengths 27 7-10 feet long. This does not include 3 3-5 feet across Coal Harbor of 3-16 inch riveted steel pipes. The 22 inch pipe cost 6.14995-72 cents per pound delivered in places; the 16 inch pipes 6.637948 cents per pound and the 12 inch pipes 10.49-206 cents. The calculation of the quantity of earth excavated for the pipe north of the Inlet was from the specifications not from the actual measurements taken after the work was done. He could not swear that the quantity stated was excavated other than that it was done to his satisfaction.

Mr. Hamersley then went into some other items in the statement furnished by Mr. Smith, but Mr. Justice Drake suggested that it was needless to go into these details as the Arbitrators had before them the actual amounts paid out by the Company. Mr. Hamersley argued that he proposed to show that the works could have been constructed for much less money than the Company say they were.

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Mr. Hamersley then asked if a break were to occur in the cast iron pipe across the Narrows where the boulders are, what means he would take to repair it, but Mr. Smith would not venture an opinion. He could not describe how the pipes were handled after they were coated, he thought all proper care was taken. He did not know what means were adopted by the contractors, to recover those places where the coating was rubbed off.

The arbitration then adjourned till 10 o'clock this morning.

Hon. Theodore Davie came over from Victoria on Sunday and will assist in looking after the interests of the Company. Mr. R. P. Rithet is expected to arrive this morning, and will be a witness in the case. There were very few listeners in the room yesterday.

When the Water Works arbitration resumed yesterday morning, Mr. R. P. Rithet was the first witness called. He was examined by Hon. Theodore Davie. He stated that in 1835 he was a director of the Vancouver Water Works Company and of the Albion Iron Works Company. The report of a committee of the directors of the Water Works Company of which the witness was a member, regarding the purchase of pipes for the Works was read. In this it was stated that the committee recommended that the material for the pipes be purchased through Welsh, Rithet & Co. Mr. Earle was never a member of the Albion Iron Works Company. They figured very closely on the cost of the steel pipes and decided that if the Iron Works purchased the plates they would charge a profit on the outlay. The Water Works Company consequently decided to purchase the plates themselves and assume all risks in the transportation. The Albion Iron Works were to make up the 16-inch main with all joints headed, caulked and guaranteed, for 76½ cents per running foot and for the 22-inch main 96 cents. This occasioned a saving he estimated of \$3,772. For the cast iron pipe the cost was 2.7 cents per pound. He thought it would cost about half a cent per pound more now. The Company had secured prices from different firms. There was in all 1,307,705 pounds amounting to \$35,803 including financing, duty, transportation and all charges. The material was guaranteed by the manufacturers to stand 72,000 pressure to the square inch. The Albion Iron Works tendered for the pipe for the Victoria Water Works at the same price as the Vancouver Water Works Company had paid for theirs, namely \$1.48 per running foot for the 16-inch pipes.

Hon. Mr. Davie asked to put in an extract from records of the Victoria City Council showing that that city had paid

the same for their pipes as the Vancouver Company had paid for theirs, but Mr. Justice Drake deemed it not necessary.

As to the contract for excavating the trench and filling again Mr. Rithet stated that the first tender of Keefe & McGillivray was considered too high. A contractor was sent over from Victoria to figure on it and his tender was much higher still. Keefe & McGillivray's tender was afterwards reduced to \$36,000 and accepted. The commission on the purchase of the pipes was 2½ per cent. The ordinary commission Mr. Rithet charged for such business was 5 per cent.

The Directors had held many regular meetings besides informal meetings and all have lost a great deal of time over the business of the Company. A sum was therefore voted to the directors to recompense them for the loss of time.

Mr. W. F. Bullen, manager of the Albion Iron Works Company, was next called. The plates supplied for the steel pipes he said were up to requirement. They were coated with a mixture of asphaltum and tar. This preparation was made from direction of a pipe-making factor in San Francisco and from printed works on engineering. The bath used for coating the pipes was about 30 feet long. The mixture was kept boiling for about six hours. The pipes were then immersed and remained in it until they became of the same temperature as the bath. They were then taken out and hung up to dry. The workmen had a barrel of the preparation to cover any part that had been rubbed off.

Cross-examined by Mr. Richard, Mr. Bullen said the pipes that had been taken out of the Albion Iron Works became condemned by the Water Works Company are now on the wharf in Victoria. It was not yet settled who owned them. They were short of the 16-inch pipe at made this up from other plates furnished by the Iron Works Company. The nipples were cut out of the plates. The Iron Works had to give credit for the plates used. There were about 50 lengths taken up and relaid. The steel pipe came from San Francisco welded in different lengths and the Albion Works only shrunk on the cast iron joints.

Mr. Hamersley asked for the account between the Albion Iron Works Company and the Water Works Company on each contract.

Mr. Bodwell met this by the statement "Give us in writing what papers you want us to produce and we will bring them," but Mr. Richards thought he had been very remiss in bringing those he had already been requested to produce.

Mr. Bodwell stated that Mr. Salisbury had prepared an abstract of those accounts, but Mr. Hamersley did not think so. Some more discussion between the counsel of the opposite sides occurred which ended in Mr. Bodwell and Mr. Bullen both agreeing to furnish the detailed accounts.

The quantity of steel pipes condemned as not up to standard and now on hand was the matter of a sharp discussion between the Council. Mr. Bullen did not know how much there was; neither did Mr. Bodwell but it was agreed that this amount should not be charged against the City.

Mr. Rithet was recalled to answer some questions regarding the cost of new kalmained pipe across the Narrows. The cost of material was \$9,500, the joints on the 12 inch pipe cost 35 cents each and on the 16 inch 45 cents each. The accounts with the Albion Iron Works on the new mains amounted to between \$6,000 and \$7,000. The pipe rejected was left with the Albion Works as the parties most likely to use it next.

Mr. H. B. Smith was recalled. To Mr. Hamersley he said he had not been at the dam since December last. The dam was filling up with shingle that kept falling into it. He had surveyed no laid for the Company at the dam except 100 feet on either side the rear end. He had surveyed the pipe line, a strip 33 feet in width. He had heard there were certain people held claims through which the line passed. As to the size of the tunnel he had walked through it without having to stoop. His theory for the first break in the cast iron main was that the pipe was strong enough to stand the original test but not sufficient for some hydraulic shock they had been subjected to afterwards. He had been told that the City about that time had men engaged testing the hydrants. As to some of the large rocks in the Narrows those alongside the pipe acted as a protection to it.

Col. Isaac W. Smith, Superintendent of the Portland Water Works, was the next witness. He had had 45 years experience in engineering in all its branches and for the past ten years had been exclusively engaged in hydraulic engineering, having had control of the construction of the Tacoma works. The new Portland works by which water was to be brought 32 miles into the City would be constructed under his charge. He had examined the Vancouver Water Works as far as two and a half miles above the Narrows. The gravitation system was cheaper in operation and safer than a pumping system.

This system gave a very good pressure, sufficient in case of fire. When the engine is attached to the hydrant the vibratory motion was apt to injure the pipes. He had uncovered the 16-inch main in seven places and in every instance found the coating intact. They had been coated in the usual way. The steel pipes between high and low water were in a good condition. The steel pipes with proper coating should be almost as good after 25 years as when put down. He did not see why they should not last 100 years. The submerged kalamoined pipe he could not say had been fully tested as to lasting qualities. He thought the steel pipe was exceptionally good. A 23-inch pipe would stand a pressure of 130 pounds, a 16-inch pipe 90 pounds, the kalamoined pipe 500 pounds and the cast iron 240 pounds. With the present pressure the system would now furnish 4,000,000 gallons every hour, and give a sufficient pressure. The kalamoined pipe could safely stand a pressure of 500 pounds. With the present system it would be impossible to put a pressure high enough to endanger the pipes. He had watched the working of the relief valves and observed that they maintained an even pressure. These relief valves would be used to lower the pressure without taking the supply from a lower source. As to hauling the pipe across the Narrows, there were three ways it could be damaged; by the longitudinal force; by the lateral force of the tide and by striking against the rocks. The pipes were stronger longitudinally than the cables, and these would break before the pipe would be injured. The transverse strain would be small, as there is little current at the bottom. The drifting sand or gravel he did not think would injure the pipe materially. Cast iron pipes are sometimes thinner on one side than the other, and when works were newly laid breaks frequently occurred. That had been his experience in one system, while for the past two years no accidents had occurred at all. He believed a coating would not stick on the kalamoined pipe. At the Tacoma works the asphalt coating had peeled off the kalamoined pipe.

The examination of Colonel Smith was continued at the afternoon session. Where the cast iron pipe had been repaired, as described by the diver, he believed it was as strong as before the break had occurred. He believed there was no point in the City where a reservoir could be constructed at a height that would give a sufficient pressure for fire protection. But for these relief valves the system would be unsafe, but with the relief valves it was very efficient. He believed the question of the submarine pipe had been successfully solved. He believed there were sufficient valves for the system.

Cross-examined by Mr. Richards, Colonel Smith said he had been associated with Mr. Schussler in San Francisco, and considered him a good authority on water works. He (Mr. Schussler) understood his business, and had been consulted by various cities on the Pacific Coast. He reported on the Portland Water Works system about six years ago. Some of his suggestions, especially those referring to location, were not adopted, while others were. In some places of the Vancouver system the earth was already off, the witness said, and in others he had them uncovered. The steel pipes being thin were rather more apt to collapse from pressure caused by the absence of air valves than the cast iron pipe. The relief valves, he thought, were very well placed, but they should have been in before the water was turned on. The shock that broke the cast iron pipe he did not think had injured any of the others. He had heard that the San Francisco Works lost a mile of pipe by the air being confined in the tube, which had not sufficient air valves. He would have preferred to lay the two mains across the Narrows at some distance from each other, that the same accident would not necessarily affect both. He had never laid pipe from a scow, as Mr. Schussler had done. It would always be difficult and costly to repair a break under the water. If protected near shore he did not see why they should be more liable to break under water than on land. Speaking of the leaks, if on land and in the City where easily got at, he would have them repaired. If across the Narrows he would not think them worth the trouble. He instance a leak that had been in existence in one of the Portland pipes for 18 months without being repaired. In his opinion the breaks had not been water tight, because the sleeve had not been fastened down tight on the rubber. He believed a pipe could be laid across the Narrows without any great difficulty.

Re-examined by Mr. Bodwell, Col. Smith said Mr. Schussler had recommended a crossing at Portland which was considered by all to be very difficult to lay, and had not been adopted. In San Francisco and San Diego Mr. Schussler would have gone around the head of the bay by a greater expense. He would estimate the cost of laying and pulling at about 50 cents

yard. Col. Smith said the submerged pipe could be protected by piles or by burying it a depth of 26 feet at dead low water was reached.

Mr. Richards asked Col. Smith about the method he would adopt in burying the pipe and in fully explaining the proposition, the latter stated the details of his plans which showed it to be a rather costly operation.

Hon. Theodore Davis then addressed the arbitrators on the question of the title and rights possessed by the Company. It had been suggested, he said, that the Company had no right to lay their pipes where they did. They were in a position where it was difficult to prove their rights, but the City had given them no note of the objections they purpose to take to their titles. He would state that the Inlet was crossed under the sanction of the Department at Ottawa. They were not able to produce the letter of permission, but if the City insisted on it, they could conclusively prove the existence of such permission. The Company were in the position of vendors, and could not be expected to state their titles till the City notified them what particulars they required. When this was done they would be able to give all necessary proofs.

Mr. Justice Drake stated that the arbitrators wanted to know what dealings they had had with the owners of the land.

Mr. Richards reminded Mr. Davis that he had asked Mr. McFarland several questions with regard to that. He would now ask in the first place what right the Company had to take water from the river. They apparently had no permission from anyone and he feared a dispute would arise similar to that in Victoria. In the second place had the Company acquired the right to any land where the dam is situated or where the pipe is laid? Had they acquired the right to pass through the Indian reservation or across the foreshore? In the third place, had the Company obtained any permission from the Dominion Government to lay pipes across navigable waters? One vessel, it appeared, had been injured and the Company evidently felt themselves to be trespassers or otherwise they would have sued the ship for damages done to their pipe. In the same connection he would ask what permission the Company had to lay their pipe line across Stanley Park, a Government reserve, or across Coal Harbor? Some disputes had already arisen and he would like to be protected against any further trouble of the sort.

Mr. Davis: "The Company cannot undertake to guarantee the City against any possible claims that may arise. The City never informed us what titles they would deem sufficient and consequently they were not now ready to produce their papers." Mr. Davis also stated that the Provincial Government claimed the control of Stanley Park and eventually the Indian reserve would be turned over also.

Mr. Richards remarked that Mr. Eberts had been paid a good fee for expenses in connection with the organization of the Company and he should have seen that all these rights were secured.

Mr. Davis stated that any claims that had come up had been settled by the Company but they could not anticipate. Only those who had secured their titles previous to the incorporation of the Company could put in any claims. As to the right to lay the pipe across the Narrows the Marine Department had been communicated with and the Minister had asked Capt. Lewis to report upon the matter. The letter granting permission had been given to Mr. Keefer and was destroyed with his effects in the great fire.

Mr. Hamersley claimed they had no right to cross the park without permission of the Imperial Government as it was a military reserve.

Geo. A. Keefer, C.E., was the next witness. He stated that he was the originator of this system of water supply. In 1884 he was of the opinion that this would be a large place and looked about for a source of water supply. He had taken action too late to secure a charter that year. The distribution system of the City was designed by Mr. T. C. Keefer, C.E., who had had great experience in the construction of water works. Mr. T. C. Keefer had been consulted at every step of the work. He had also been consulted regarding crossing the Narrows. The witness first suggested a crossing considerably below where the one at present is situated. But after due consideration the present location was considered the best. The cast iron distribution system throughout the City had cost, for the 4-inch pipe with extra castings \$1,768 per mile; 6-inch pipe, \$7,484.40, and the 8-inch \$19,392.05. This did not include hydrants. He had examined the pipe at 15 places between the City and the dam and in all cases found the coating intact and not brittle. When scraped off and held in the hand it soon became plastic. The steel pipe, according to the opinion of experts at the American Institute of Engineers, at 15 years was found to be practically unim-

paired. Cross-examined by Mr. Hamersley, Mr. Keefer stated that these were the first city water works he had had anything to do with. In no instance when he examined the pipe had he noticed rust. He had examined three joints, and these showed no rust. No experience had so far been had of the life of steel pipe, but the inference was that they were more durable than iron. He knew of one other case in which a pipe line had been drawn across a stretch of water. The coating on the kalamoined pipe was incorporated with the steel, and could not be rubbed off. The hauling of the pipe across the Narrows he did not think would injure it to any extent. The leaks, he thought, were well repaired, and the pipe was now practically as strong as before. The small leaks mentioned by the diver were of so little consequence as not to effect the efficiency of the pipes. The highest pressure before May 24th was 57 pounds at the Hotel Vancouver, whereas now it was 87 pounds. This increased pressure was put on because the City demanded it. The air valves were ordered, he thought, before Mr. Schussler had made his report. Those relief valves were put on in the original system but were put on sooner because the City demanded it. There had been several small leaks in the pipes throughout the City. Extreme pressure on the pipes may cause the peates to spring between the rivets. We took all the bad pipes up and put in others. In the City he could not tell whether any were taken up or not.

Notwithstanding that Wednesday was a public holiday the Water Works Arbitrators continued to hold a session in the morning. Mr. J. J. Nickson, superintendent for the Company was the next witness. As to the breaking of the cast iron main across the Narrows shortly after the line was constructed he said he thought that was due to concussion from the firemen not using the hydrants properly, and had turned on the water too quickly. The incompleteness of the distribution system may have had something to do with it. The pipes for the main on the other side of the Narrows had been carefully handled when taken off the scows. They had been placed on wagons and kept from striking each other by bags of sand placed between. They were carefully laid upon the ground and where any of the asphalt had been rubbed off the spot was again recoated. Where the first break occurred he ascertained the fact by noticing the pressure diminish on the gauge in his office. He did not know the exact moment it occurred. When the pipe broke the second time the pressure dropped from 100 lbs. to 55 lbs. It took ten days to repair the first break. There were no relief valves in the system when the water was first turned on but four were put in soon after and the whole pipe line has now nine in all, with 44 vacuum valves. There are 27 water motors running in the City and three elevators but he considered there was ample power for twice that number. The present consumption he estimated at 1,000,000 gallons per day and to consumers they charged 44 cents per thousand gallons with a special rate for manufacturers. Keefer & McGillivray had had the contract to put the kalamoined steel pipe across the Narrows. The original pipe across Coal Harbor remained still but the approaches were changed. A break a short distance below the dam had occurred once and this took four days to repair. About three lengths of the pipe had then been washed out.

A statement of the accounts of the Albion Works Co's. was put in as well as a statement of the number of meetings of the directors.

Sir Joseph Trutch was then called and made some statements about the account with the Albion Iron Works Company. There had been a dispute about \$4,000 or \$5,000 worth of pipe between the Albion Company and the Water Works Company and the arbitrators had given their decision against the Albion Iron Works Co.

Mr. J. W. McFarland was then recalled, and stated the cost of laying the new submerged pipe at the Narrows and of constructing the old one across Coal Harbor.

Mr. P. Summerfield, one of the Water Commissioners of Victoria, was recalled and made a general statement about the efficiency of the works. He thought they were very good throughout.

Mr. H. B. Smith, C.E., was called and answered some questions regarding the state of the pipe line between the dam and the tunnel. The arbitration adjourned at 1 o'clock till Thursday morning.

The Solicitors for the City, when the arbitration opened yesterday morning, began the presentation of their side of the case. Mr. Hamersley stated that the City would furnish the Water Works Company with a statement of the contentions they proposed to make regarding the works. Mr. Bodwell submitted that those should have been handed in at the beginning of the case. Mr. Richards in calling Mr. Salsbury stated to the arbitrators that they proposed to examine

him in connection with what he had said in the books of the Company, but he did not propose to be bound by the Company's books. If such were the case he would not call Mr. Salsbury.

Mr. Justice Drake suggested that the City outline the evidence it intended to put in.

Mr. Richards said in a general way they proposed to refuse any recognition of a prospective nature for the works, to show what the works should have cost, deducting an amount for bad work, poor material and the damages that have been done to the works. The details of this would be brought out in the evidence.

Mr. Drake: "Do you dispute the figures of the Company?"

Mr. Richards: "In many cases we do."

Mr. Hamersley said there were certain items he wanted to show what they are composed of and to show from what sources the information tendered by the Company has been gathered. Some items have been charged to construction that should have gone to maintenance.

The examination of Mr. Salsbury by Mr. Hamersley then began. Mr. Salsbury said he, with Mr. McFarland, had tried to verify Mr. H. B. Smith's statement of expenditure upon the works by the vouchers in the office, but after working at it for about a week they gave it up and proceeded on another tack. He certainly could not verify Mr. Smith's book. From the organization of Mr. McFarland's office, he would say that Mr. Smith having been actually engaged in the work of construction, his book should be more nearly correct. Mr. McFarland's books very nearly agreed with Mr. Smith's book in the total, but not in the details. After leaving Mr. Smith's book they began with Mr. McFarland's books to check them by the vouchers. Some examples of the differences of the two books were given. In Mr. McFarland's there was \$1,951.66 charged for meters which was not to be found in the other. Mr. McFarland's book gave the cost of the dam at \$17,241.02, while Mr. Smith's was \$18,153.63; Mr. Smith gave the cost of the main north of the Narrows as \$46,736.06 while \$44,867.12 was given by Mr. Smith's statement. Mr. Smith gave the cost of the distribution pipes as \$67,693.92, and Mr. McFarland's gave \$75,101. Mr. Salsbury had found no tally of the amount of pipes actually delivered. He was surprised to find that in works of this magnitude no separate account had been kept for materials, and he had asked about it. The only note of any materials was contained in the invoices. He found no inventory of material on hand. For the water services the books showed \$11,706.91 received in cash, of which \$11,706.91 had been refunded, but about \$2,700. In cash the Company had received \$3,172.25 for services, which they were not required to return in water rates. This sum had been carried into revenue. Of this \$11,706.91 received for services there was a balance of \$2,702.84; that is the Company gained this in the advances of subscribers. This sum, together with the \$3,172.25 received in cash, he would credit to construction, though the Company had charged it to revenue. He had figured up the gross revenue of the Company at \$59,046.36, and gross expenditure \$40,369, not including \$9,000 for directors' fees. This would leave \$18,676.67 net earnings. He had noticed that Mr. Smith had charged the great bulk of the interest against revenue. No interest had been charged on overdue bills or stock.

A statement was put in, showing what shares had been subscribed and what payments had been made on the stock subscribed.

As the counsel for the Company wished time to consider Mr. Salsbury's evidence before beginning his cross-examination, an adjournment was taken at 12 o'clock.

On resuming at 1:30 o'clock, A. F. Campbell, engineer of the Fire Department, was called. He had noticed quite a number of leaks in the main, chiefly between Columbia avenue and Carris street. He had seen some of the pipe unloaded off the scows and had judged they were handled rather roughly. During last Summer there was generally a pressure of about 60 pounds on the water supply system throughout the City. This would hardly do in case of fire, as the engine usually furnished from 125 lbs. to 260 lbs. pressure. The firemen now attach the hose directly to the hydrants. They had made no test of the stream of water thrown since the higher pressure had been attained. He had no much experience with hydrants, but thought those in the City were so arranged that the water could not be turned on very suddenly.

Chief Carlisle was then called to give evidence as to the efficiency of the system in case of fire. He had been Chief of the Fire Brigade for 4½ years. Just after the system was put in, he had noticed many small leaks, chiefly between Cambie street and Westminster avenue. This was for the first month or two after water was first turned on. The hose was attached to the hydrants for the first time in May, 1889. The fire engine was attached once in September

39. On that occasion the engineer did without his knowledge. The Secretary of the Company had instructed him if he were to attach the engine direct to the hydrants he would be to become responsible for any damage done. At that time there was about 65 pounds pressure at the fire all but where the engine was attached that day, at the corner of Seymour and Pansmuir street it was not more than 30 pounds. As soon as he reached the engine he directed the men to detach it from the hydrant so that he did not see it only for a very short time. The hydrant seemed loose then, at no other time was the engine attached to the hydrant. At the last two fires there was pressure of about 40 pounds at the hydrant. The hose was attached to it when the firemen arrived and with that water kept checked until the engine came. The brigade, however, reached the fire very shortly after it had commenced. On one occasion a pebble had got into the nozzle and obstructed the flow of the water. At another time a piece of bone came out of the nozzle. At some of the high levels of the City the pressure of the hydrants was hardly sufficient to give the water the engine would use. He has watched the water range at the central fire hall and noticed that at times it fluctuated very rapidly and sometimes the indicator would vibrate quite suddenly. Mr. Carlisle produced a tabulated statement of the pressure registered by the gauge in the fire hall on every day of the year 1890.

Mr. Bodwell in his cross-examination went into the correctness of the statement given by the witness as to the pressure. When the pressure ran low he asked if that might not have been caused by the gauge being out of order. He also asked if there were not certain days that the gauge did not work properly and whether the tap from the main into the hall may not have been leaking. As to attaching a fire engine to the hydrant direct Chief Carlisle said he had seen that done in Seattle. A pressure of 80 pounds he did not think sufficient in case of fire as 500 feet of hose would reduce this pressure by 35 pounds. The 87 hydrants at the corner of Georgia and Hill streets he thought would not be sufficient to throw a stream to all of the Hotel Vancouver. The water would have to be carried up into the higher stories. They told the Water Works Company to the full pressure of their system had never done so.

F. Salsbury was then recalled and examined by Hon. Theodore Roosevelt related to water expenditures. The witness thought should go into maintenance and what to capital. Mr. Salsbury had heard of an account of a railway book-keeping called "pettermen", but he would not use such a term. The first few questions were with the object of showing that Mr. Smith's books and those of the Secretary differed only in the segregation of accounts. The balance to be refunded to subscribers for water service, and the amount coming to the Company for which no returns were to be made, was also the subject of a number of questions, but the amounts given by the witness in his examination chief remain unchanged. As to the telephone line to the dam, Mr. Salsbury said the Telephone Company offered to construct it for \$1,500 upon certain conditions, whereas the Water Works Company had paid \$1,843.71 for the construction of the line. It was pointed out that now the Water Works Company owned the line, and could operate it without calling on the Central Office. The payment of interest by the shareholders on the overdue calls on stock was also gone into. Mr. Salsbury contended they could pay at the rate fixed by statute, specially as the Company were paying interest on an overdraft in the bank.

John P. Lawson, ex-City Engineer, was then called. He stated he was a mining engineer by profession. He had seen the pipes where uncovered on Hastings street for repairs, and had seen rust on them then. When the works were building he had been sent across the Narrows in his capacity as City Engineer to see how soon the water would likely be turned on, and on that occasion had seen some of the pipes with the coating rubbed off. He thought he saw the men with a preparation of asphalt to repaint any exposed parts.

Mr. James F. Garden was the next witness. As to profession, he said he was a Dominion Land Surveyor. He had gone over with Mr. Schussler when he made his report upon the works in 1890. On that occasion they commenced at the Inlet and had examined the pipe line as far as the dam. He had also gone over the line again in May, 1891, with Mr. Warren, and again with Mr. Macdougall in June. On the foreshore the pipe was covered by cedar stakes, but these formed no protection against rust. He, with Mr. Schussler, had examined the line where uncovered, and found the coating off and a good deal of rust. They

had the earth removed from the pipe in several places, and had found rust. He had brought a scale of the rust across to the City. The coating had been rubbed off in several places. In May last they had excavated to the pipe in several places and had seen rust on more than one occasion. The pipe, he thought, was not securely laid. At one place it rested on a crib work of poles which looked very insecure. The dam, he thought, did not serve the purpose of a settling basin very well as the current was nearly as swift through it as in the remainder of the river. The bar of shingle across the dam had increased in size since last year, and extends from the intake to where the two streams meet. Just below the dam the pipe was protected by a breakwater but very poorly built. At another place there was a very imperfect culvert for a mountain stream to cross the main. At another place the line rested on a very weak crib work and a landslide would take it off the side hill; he saw nothing there to protect it.

Mr. Bodwell's cross-examination put particular stress upon those places in which it failed to agree with what Mr. Schussler had said. Referring to a place where Mr. Garden had said the pipe line was poorly constructed, Mr. Bodwell asked him to specify the particular place on a large map of the works hanging on the wall. Mr. Garden said the pipe at that place was within a few feet of the river, but the map did not seem to show it that close. He would not say, however, the map was wrong. The crib work on which the pipe rested at one place was well put together, but the timbers were altogether too small. Mr. Bodwell then asked some questions regarding the part Mr. Garden had taken in trying to defeat the Capilano scheme when before the people. The latter admitted he had been a steady opponent of the Capilano system because he believed the other better. He was still opposed to the Capilano system because he thought it was the wrong place to locate water works; not from any personal reason. The arbitration then adjourned.

It is reported the City will finish their side of the case this evening.

When the Water Works arbitration resumed yesterday morning, Mr. Bullen, manager of the Albion Iron Works, who submitted a statement of the total plates received by them from Rithet & Co. In all 10,900 steel plates had been received. The total weight of the 16-inch plates was 793,956 lbs. of which 1,675 lbs. were bad, and 3,659 lbs. remains on hand. Of the 22-inch plates 456,432 lbs. were received; 1,836 lbs. of these were bad, and 66,508 lbs. remain on hand. Of the 12-inch plates 47,550 lbs. were received; all was good and 5,896 lbs. remain on hand. In making up the 16-inch and 22-inch pipes about $\frac{3}{8}$ inch of each plate was cut to waste but there was no waste on the plates for the 12-inch pipes. These quantities were all checked at the Works. Of the plates 10,618 lbs. were made into nipples.

Mr. Allan Macdougall was then called by the City. He had given considerable attention to hydraulic and sanitary engineering and had frequently been called upon to give expert testimony on hydraulic engineering. He had examined the Vancouver Water Works system on June 22nd last, in company with Mr. Schussler, Mr. Warren and Mr. Garden. At the rock tunnel the pipe was rubbed at the north end more than the south. About 100 feet further north he found the pipe rested at the band. At another place he found a small spot of rust and at the blow off the asphaltum was rubbed off part of the pipe. At the second valve the coating was off for about 7 inches square. There was considerable rust at the third opening. At the fourth there the coating was off as rust was beginning. At the fifth and sixth opening the coating was off. At the seventh the pipe was exposed but no rust. At the eighth there was signs of rust. He suspected the dam and found a considerable quantity of gravel filling in above the dam. The accumulation was about 400 by 60 feet and ends opposite the fish screen. It would be difficult to say when this gravel would reach the settling basin. The flood had apparently washed out some of the bank. The pipe was laid along flat land near to the river bed. In some places it was from 10 to 12 feet from the water. Along the flat about the tunnel the pipe line is apt to be injured by any freshet. The land was of light material that would wash out easily. From south of rock tunnel along the hill side the line did not give him the opinion of having been finished with the necessary care. There was a small embankment of earth over the pipe, which would form a place for the wet to lodge. Between the two tunnels he found some imperfect crib work; the number of tie pieces was not sufficient. He found the culverts of a very temporary nature. On the flat there was no difficulty, but a large quantity of the pipe was left exposed. The pipe simply lies in the trench. The pressure tank had been taken away and a valve

put in its place. It had prepared an estimate of the cost of the entire works. He estimated the dam had cost \$17,000, but some deduction should be made for sediment of gravel that had formed; perhaps \$2,000. His estimate for the submerged main was \$12,580.50. He had calculated on 1,236 feet at \$9 per foot, and 1,052 feet at \$5. He would estimate the present value of the cast iron pipe at about half its original cost. He estimated the cost of construction, north of Burrard Inlet, at \$36,231.58. This would not include anything for the pressure tank. He then went on to show how he had arrived at that sum total. He had estimated the cost of labor after making inquiries as to rates of wages here. The total value of the work he put at \$278,314. He had allowed 5 per cent for engineering and cost of organization. This would not include such a cost as \$1,000 for Col. Eckhardt's report, which he termed a luxury.

This closed Mr. Macdougall's examination in chief. Mr. Davis then asked what course the counsel for the City intended to pursue for the remainder of the case.

Mr. Richards said he had been handed a statement of the expenditures incurred by the Company in the construction and maintenance of their works, and this was all he had legally before him. If they propose to abandon the dam for the franchise, he was prepared to conclude at once.

Mr. Justice Drake mentioned that Mr. Bodwell had made a claim for the compensation for the franchise immediately upon the opening of the case.

Mr. Richards said he had evidence to show on the question of franchise. He offered to put in copies of a letter from the City Council to the Company and from the President of the Company in reply.

Mr. Davis objected to such a letter going in evidence and he refused to produce it. A letter from the City Clerk to the President of the Company as he deemed it irrelevant to the question.

In these letters, written in November, the Company had consented to have a certain construction put upon the word "valve."

Mr. Justice Drake held that the arbitration was sitting under the recent Act amending the charter of the Water Works Company, and any understanding between the parties previous to the passing of the Act would not bind the parties, and the letters were consequently inadmissible as evidence. Mr. Richards stated that relying on the interpretation put upon the word "valve" in the letter referred to the City had not mentioned that matter when the Bill was before the House. Had the members so understood it the amendment would not have been granted to the Company's Act of Incorporation.

Considerable discussion took place on the question in the course of which Mr. Hamersley pointed out that the letters were pertinent as showing what value the Company put upon the work then. It was similar to a man admitting he had sustained only \$50 damages and afterwards suing for \$10,000.

Mr. Davis said there were strong reasons the Company had at the time the letter was written to accept a reasonable offer or even to dispose of them at a sacrifice, but now this was all changed. It was then agreed among the parties that hearing of the evidence should conclude to-day and argument take place in Victoria on Friday next.

At the opening of the afternoon session Mr. Allen Macdougall was cross-examined by Mr. Bodwell. The first day he had been examining the pipes Mr. Nickson was one of the party, on the second day he was not. Particulars were given of the places in which rust was found. Part of the pipe line was fairly well constructed but some of it he considered unsafe. The injury done to the efficiency of the dam through the accumulation of gravel above was gone into and Mr. Macdougall would deduct \$1,000 from the value of it as an offset. The efficiency of the crib work was gone into but no points were brought out not touched upon in the examination in chief. That part of the pipe along the hill side he thought was cheaply done at the expense of safety. One evidence of the danger from an earth slide was a place where a tree was blown down and the roots had slid down the hill upon the pipe. Mr. Bodwell then went into the method by which Mr. Macdougall had arrived at his estimate of the works. The witness said he had planned and constructed the St. Catherine's and Stratford sewer systems and Port Arthur and Lethbridge water works. He admitted he had not had experience in laying pipe through a country of that nature. All the different items in his estimate of the cost of the work were gone over but Mr. Macdougall maintained the figures previously submitted by him. His estimate, however, did not quite agree with Mr. Schussler's.

Mr. H. B. Warren, ex City Engineer, was then called. He told what work he had been engaged on as an engineer. He had been twice over the pipe line, the first time in October, 1890, when there

was a break in the pipe, and again in May last. He had gone as far as the pressure tank in June. On going up the first time he found that the freshet had washed away the earth from under the pipe leaving it suspended and a joint had drawn apart. Below that he found the pipe exposed from the earth being washed away by water flowing down from the hills. He saw this in 7 or 8 places, the widest perhaps 10 or 12 feet wide. There was no provision in these cases to convey the water either below or above the pipe. The coating was off at most of these places. Where the pipe was broken it lay in the old bed of the river, a very dangerous position. It required about 400 feet more of cribbing to protect the pipe. He did not go through the tunnel as it was too small to go through conveniently. He described the deposit of shingle at the dam as Mr. Macdougall and Mr. Garden had and he also gave the same evidence with regard to the amount of rust upon the joints. On the side hill he considered the pipes in a dangerous position, and no precautions had been taken to protect it. In the City system he had noticed that the pipes were too near the top of the ground, and would likely be interfered with in building streets. The pipes had been uncovered on Princess and Oppenheimer streets. In some places he had found only about 18 inches of earth above them. In removing earth for permanent pavements the pipes would be laid bare in some places.

In the cross-examination by Mr. Bodwell, Mr. Warren said he had considered the water mains were too near the surface of the streets to allow of permanent paving being done with safety. Mr. Bodwell suggested putting in a sluice at the dam and clearing out the shingle. Mr. Warren thought this would cost upward of \$500. He could not suggest a better position for the pipe along the hill side than its present location.

Mr. Richards again asked to have the correspondence between the President of the Water Works Company and the City regarding the arbitration put in as evidence, but Mr. Justice Drake again objected, and refusing it, notwithstanding that Mr. Richards and Mr. Hamersley argued that it would be of use to the arbitrators, as showing what value the Company had put upon their works.

Mr. Davis contended that the circumstances under which the letters were written had been entirely changed since, and it would be unfair to even mention those letters without going into all the details. In justice to the feelings of his clients he should be granted a right to make an explanation.

Mr. Justice Drake—Companies have no feelings to hurt.

Mr. Drake further said that the duty of the arbitrators was to determine the value of the works at the present moment, and the franchise possessed by the Company was certainly a matter to be considered.

When the Water Works arbitration met yesterday morning for the last session for the hearing of evidence, Mr. Bodwell, for the Water Works Company, put in a statement giving the names of all the parties holding pre-emptions below the dam and a list of the times the Company hold to their right of way obtained from parties holding land previous to the construction of the works.

Mr. Hamersley asked for a list of the unsettled claims made against the Company by parties holding land along the pipe line.

Mr. G. A. Keefer was then recalled by the Water Works Company. Some misunderstanding, he said, had arisen about the bar at the dam. It had been there previous to the construction of the dam and could be prevented from increasing by cutting a conduit through it.

To Mr. Hamersley, he said, he thought it would cost as much to remove the sediment from a reservoir as to remove the shingle bar that would form at the dam. He had had no personal experience in confining a mountain stream to one channel. The boulders placed around the pipe had been undermined rather than carried away last Summer by the freshet.

Mr. Hamersley put in a statement showing the total amount of interest paid by the Company since its formation.

Mr. W. F. Salsbury was called to prove the statement. He said the items were for interest charged by the bank on overdrafts and on current accounts. The total amount was \$8,286.53. Some parts of this interest was included in the construction figures.

Mr. Hamersley said the Chief had the Fire Brigade now ready to show the arbitrators what state of efficiency the works were in should a fire occur.

Mr. Bodwell said, if it were to attach a hose to the hydrants they had no objection, but they would not have a single acting engine attached to the hydrants under any circumstances. Even Mr. Schussler had stated that such an engine would be harmful.

Mr. Justice Drake thought the registered pressure was sufficient to judge from. Mr. Davis stated that there were two claims outstanding against the Company,

from Ward of \$1,500, and another from the Vancouver City Board of the same amount. There was \$2,650 of solicitor's fees since the organization of the Company still unpaid.

Mr. Richards mentioned that Mr. Bodwell had got some \$1000 for getting the bill through the Legislature while Mr. Eberts had got a payment in stock. Mr. Eberts expressed his readiness to go into the details of the Solicitor's charges.

Mr. Davis also mentioned two City lots the Company owned—lots 33 and 37, x6. The Company valued these at \$6,000.

Mr. Hamersley pointed out that in their last balance the Company had put these down at \$1800.

Mr. Justice Drake suggested that the assessed value be taken.

Mr. Edwin Rand, who had been sent for, arrived at this moment and was called to give his opinion as to the value. He said he considered the lots worth \$6000. They had been offered \$3300 for a lot on the opposite side of the street, but the owner wanted \$3500.

Mr. Hamersley—We prefer to take the assessed value.

To Mr. Richards, the witness said the vendor always paid the commission which was 5 per cent. The lots might not be sold in a day for that sum but he would consider them worth \$6,000.

This closed the evidence in the case. Mr. McFarland submitted a statement of receipts and expenditures of the Company for June which will be audited by Mr. Salsbury and sent to the arbitrators when they meet in Victoria. Mr. Bodwell said he would furnish the counsel for the City with the particulars of the bill for \$2,650 for legal expenses. It was then agreed that the Arbitration should adjourn till Friday next at 10 a.m. in Victoria when counsel for the parties will argue the case. The award will not be made for some time.

The evidence taken before the Arbitration, including the opening address of Mr. Bodwell, amounts to 1,845 folios of 100 words each. Mr. Fred Evans and Mr. Elliot, of Victoria, have worked together in taking this down in shorthand and transcribing it, and have done their work in a most satisfactory manner. The Arbitration has occupied 11 days, during which 19 sessions have been held and 19 witnesses examined, but some of these have been recalled several times. The argument in Victoria is expected to occupy two days.

Argument in the Water Works Arbitration Opened Yesterday at

Victoria, City's Case Being Presented.

July 14th 1894.

The Water Works Arbitration.

From Our Own Correspondent.

Victoria, July 10.—The principal business in the Law Courts to-day was the Vancouver Water Works Arbitration which opened at 10:30 and lasted all day. The Board of Arbitrators is composed of Mr. J. M. Downing, C. P. R. Land Commissioner, of the City of Vancouver; and Mr. E. G. Tilton, for the Water Works Company, the Hon. Mr. Justice Drake acting as referee. Mr. Hamersley, who has associated with him the Hon. A. N. Richards, appears for the City, and Mr. E. V. Bodwell with Hon. T. Davie, represent the Company. Mayor Oppenheimer and a number of prominent Vancouverites were in attendance when the argument opened. Hon. A. N. Richards was the first to address the Board. His remarks were introduced by an explanation of the circumstances connected with the passage of the Vancouver Water Works Company's Bill. Two companies had come forward soliciting the right to supply the new, but promising, City with water. To one, the Coquitlam Company, an absolute franchise was granted; to the other, power was given to construct water works which, however, might at any time be taken over by the City. The Company's existence was dependent upon the City's wish. The works have been built and the City finding them not suitable was now anxious to gain possession and make them so. At present the works provide no fire protection, the distribution service was imperfect, and leaks and stoppages were of frequent occurrence. It was essential to the safety as well as to the health of the City that there should be a good water supply and hence the desire to acquire and improve the existing system. The City was prepared to pay for what it expected to receive in the manner provided by the Act but now the Company came forward with a surprising statement that their selling price was in the neighborhood of \$2,000,000. This could no doubt amaze many who

remembered that the total amount paid out by the Company for the assessments they valued so highly was something like \$275,000. The method of arriving at the value of the works and the property to be paid for by the city, was clearly defined by the Act and open to no two interpretations. The arbitrators were instructed to ascertain what the works would cost if undertaken now, and having ascertained that value, to add 20 per cent. Then the city was also required to put the expense of maintenance and repairs and a dividend of 10 per cent. on the capital stock to the holders. It was here that the learned gentleman rested his argument, contending that a franchise such as that held by the Company had no value, and that the case was in no way similar to one of eminent domain. The case had been intelligently met by the Legislature in framing the Act of incorporation, and it alone was sufficient to guide the Board in determining what to value. Mr. Richards closed his remarks at 1:30 o'clock and the Board took a recess of one hour for lunch.

At 2:30 o'clock promptly the Board reassembled, and Mr. Hamersley followed his associate on behalf of the City. In opening his remarks he stated that he would confine himself to a review of the statements introduced to show the cost of construction of the works, and he thought that he could demonstrate to the Board that an erroneous and enormous value had been set upon them by pointing out the inaccuracies and discrepancies as shown between the accounts of Mr. Smith and those of Mr. Macfarland, and the wide difference of cost as given by the Company, and what it should be, as shown by expert opinion. After reviewing the cost of the construction of the works, he would then endeavor to show their value as an income producing property. Regarding the value of the works Mr. Hamersley said that it was only necessary to go into the discussion of what they cost and what they were now worth. If that view was taken by the Board, the matter would be reduced to a very simple proportion. But if the construction that is asked to be put upon the matter by the Company is what it can be bought for according to its revenue and its value as a revenue producing property, then the City must endeavor to show that such an estimate is totally excessive and exorbitant. He assumed as the line of his argument the decision Mr. Richards had asked them to arrive at. That was the actual cost of construction and then to go into the question of what revenue has been made and what will probably be made in the future. He announced that he should consider the cost of construction altogether apart from the location, the value of which he denied. The dam was entirely too expensive. He claimed that in the figures given by Mr. Smith and those of Mr. Macfarland there was a discrepancy of about \$1,000, and the opinions of the experts were that it could have been built at considerably less than stated by the Company. It was filling up and its value was as a consequence seriously affected. The cost of the cast iron mains was exorbitant, and several thousands in excess of what disinterested experts said it should have been. Mr. Schussler testified them to be of no value, and Mr. McDougall said that one half should be taken from his estimate as to their first value, because of the breaks that had occurred and their condition at the present time. Take the matter entirely from the evidence, the City asked the Board to reduce the amount to one half

of the first cost as it was only fair to presume that the mains were not as good as when laid. The \$1,500 in the Westminster Sheriff's hands to cover litigation and \$102 attorney's fees was also asked to be deducted as it could not properly be charged to the cost of the mains. In regard to the extensions of the mains the cost was attacked, and the City contended that in basing the amount to be allowed for that, the current rate of wages ought to be taken into consideration as the works were now being valued. Item by item in the construction account was passed over by Mr. Hamersley until the price of the steel mains was reached. He reviewed the entire evidence on that point, and sought to show that as the testimony of Mr. Bullen of the Iron Works, Mr. Smith and Mr. Macfarland was conflicting in regard to the matter, it could not be considered reliable, and that of the experts should be considered as the only reliable evidence. From the amount of \$71,896 which the distribution had cost, he asked that the cost of all two and a half, two, one, and quarter inch pipes be deducted, as the testimony of the experts showed them to be of no value, as they were of inadequate size. An item objected by counsel for the City was one of \$421 for right of way through Mr. McKay's property. Two hundred was paid for right of way, the balance for the expense of the arbitrators. He maintained that

the difference could have been saved if the Company had paid his price in the first place.

Mr. Bodwell raised a laugh by informing Mr. Hamersley that Mr. McKay would accept nothing less than \$3,500 before the award of the arbitrators.

Mr. Hamersley had not concluded his remarks at 5:30 and the Board adjourned at that hour to reassemble at 10:30 tomorrow morning when he will resume.

Heimerer, Vancouver, sat.

For the City and listened to the arguments. Mr. Hamersley who commenced yesterday afternoon on behalf of the City resumed the line of his argument. His remarks the previous day were directed to an attack upon the position of the Water Works Company in which he had endeavored to show their statements to be inaccurate and unreliable and the costs of the works as represented as exorbitant. This morning in beginning his argument he disputed the interest as paid out by the Company from its organization up to date, and claimed that only such interest as had accrued before the commencement of operations should be charged to the cost of construction. The balance which had accrued since should be charged to maintenance. Mr. Hamersley then proceeded to argue upon the value of the Water Works as a revenue producer. According to the statements of the Company, if the most favorable construction possible were placed upon them, not over three per cent. of the original cost was realised by the Works in revenue. The counsel maintained that it would not be fair to take the revenue as shown by the Company for the various years and to continue the pro rata increase for 25 years in order to assist at arriving at the value of the works. There was no telling what might happen in the future. It was, of course, to be hoped that Vancouver would continue its marvellous growth, but the life of western cities was uncertain, especially under the peculiar conditions of the Pacific Coast. If the arbitrators were to base the value of the water works upon the revenue and allow the same ratio of increase each year in the past for each year of the next 25 a great wrong would be done the city did it not increase. It could not be assumed as a fact that the increase would proceed for the next 25 years as it had in the past. In closing his remarks Mr. Hamersley asked the arbitrators to make their findings in accordance with the manner proposed by the Act and Charter as shown by Hon. A. N. Richards in his argument yesterday. That was to take the cost to the Company of the construction of the Water Works from which should be eliminated all expenses and costs of an unnecessary character, and all useless charges. To the amount thus obtained should be added 20 per cent. and a 10 per cent dividend on the capital stock. There would then be obtained the price at which the City would be entitled to purchase the works.

At the close of Mr. Hamersley's argument Mr. E. V. Bodwell proceeded at once to outline his policy, which was to attack the position assumed by the City and so ably maintained by Mr. Hamersley. After a few remarks from Mr. Bodwell showing the line of his argument, the arbitration took a recess until 2:30 o'clock this afternoon.

After the recess Mr. Bodwell resumed. He denied that the expert, Mr. Schussler, had given any reason for his condemnation of the iron mains and quoted from the evidence to show that Mr. Schussler had admitted lack of experience in his observation of the effects of salt water on cast iron pipes. Mr. McDougall, the other expert, had acknowledged that the cast iron pipe was in good working condition, but gave it as his opinion that it was only worth one-half of the original cost. He could not, however, give a satisfactory reason for that conclusion. Mr. Bodwell contended that the cast iron pipe was as good as ever, and that the Company was entitled to its full value as a commercial commodity. Regarding the breaks in the pipes the engineers on both sides had practically admitted that there had been no deterioration in value.

The question regarding the steel mains was next taken up, but the arbitrators informed the counsel that argument on that subject was unnecessary, as the evidence of Mr. Bullen, of the Albion Iron Works, was satisfactory and confirmatory on that point.

The evidence of the City's experts was next discussed and was gone over section by section, and compared. Mr. Bodwell declared Mr. McDougall's testimony unworthy of consideration from the fact

that without any experience on the Pacific Coast, without any knowledge of the expenses of organization and the secretarial work connected therewith, which he admitted he was in ignorance of, he had undertaken to pronounce five per cent. sufficient to cover the expenses of organization and preparation. Notwithstanding his sworn evidence, Mr. McDougall had admitted after leaving the witness box, that he should have added \$5,000 to his estimate for the cost of organization. Such an opinion from an alleged expert was of but little value, in the face of positive and uncontested evidence of what has been actually expended on the works. Speaking of the expense of the maintenance of the works per year. Mr. Bodwell argued that if the argument of Mr. Hamersley on that point was to be taken, it was not a fair criterion. It was not what it cost to operate the works for one particular year but rather the average that was obtained from different years. It was not fair to assume that the unusual expenses of one year would be of annual occurrence. Breaks would not occur every year and it was not a fair proposition to assume that they would. Consequently the charges incurred through

ments of the tangible property of the Water Works Company is to be acquired by the Corporation by purchase but its privileges, otherwise its franchise, is to be acquired under the law without compensation. The law, however, did not calculate to take away private rights. There is nothing in Section 15 of the Act which grants that power even by inference. Vested rights can't be taken away. The franchise of the Vancouver Water Works Company, granted by the Legislature gave the right to divert water from the Capilano River and convey it to Vancouver. It has the right to use 440,000,000 gallons a day, much greater than is taken from the Thames for the supply of the City in London. This right to divert the water from Capilano River is granted by the Legislature in perpetuity, and cannot be taken away. It also gives the Company the right to conduct the water over public and private property for distribution. The right to divert the water would be of no value unless the Company could be permitted to distribute it, and to do so it was necessary to cross public and private property. The former privilege was of little value without the other. The Act also gave the right to charge the inhabitants of the City of Vancouver for the water supplied thus enabling the Company to derive a revenue. The franchise, it was argued by Mr. Davie, was the most valuable asset of the Company, and entered largely into the consideration of the case. He denied that the property could be appropriated under the Special Act in any different manner than under the provision of the General Act, which provided for just compensation when private property was taken by compulsory methods. Authorities were quoted to show that even if the ownership was only a base fee, they should receive compensation the same as if held in fee simple, should it be taken away. The whole affair was very unjust to the Company. It was bound by the award of the arbitrators, and if the City went to take the property it could do so and the Company could not appeal. On the other hand if the award did not suit the Corporation, it did not have to abide by it. Should the Corporation be satisfied it was not at all settled as the ratepayers might vote down the By-Law for the purchase of the Works. The Company was, therefore, placed in a very unjust position. The law of compensation was plain and for years in England had been generally adopted and there were three eminent legal works upon the subject. To arrive at the value of the property revenue must be ascertained, that amount capitalised by the number of years purchase. The term of such

According to the character of the business from ten to twenty-five years. The capital thus obtained should be added to it from 10 to 50 per cent. and the value arrived at by arbitration would be added to that and the amount would be a just compensation for property compulsorily taken. In his argument Mr. Davie maintained that it was not the intention of the Legislature when granting the franchise to have the value of the Water Works computed in the manner claimed by the City's counsel, but that it was clearly the intention to consider what the property and franchise were worth to the owners at the time of sequestration and then add to same the sum of 20 per cent. of the amount. The City considered the sum of \$2,000,000 excessive but the property was easily worth that to the Company. The stockholders had put their money into it when Vancouver was not the City it is now, and at a time when it was scarcely to be expected that its growth would be the phenomenal one that it had been. At the time they did not know for certain whether it would be a success or a failure. Its construction was as advantageous to Vancouver as to the Company. A city cannot get along without water, and it was a great factor in the growth of the City. Now the Corporation steps in and wants to take this property away from its owners without compensating them for the actual sum expended upon it. Its expenditures were contested, and it was alleged that they were unnecessary and extravagant or at least could at the present time be accomplished for less money. Instead of taking the present value of the property as a basis, the Corporation was endeavoring to go back to five years and to decrease that by asserting that labor and material was cheaper now than then and that the Works could be built much cheaper if constructed now than at the time of five years ago. Such an argument he pronounced ridiculous, and the Attorney-General cited the enormous value of the real estate in the same length of time.

At the conclusion of the address of the Attorney-General, Hon. Mr. Richards made the closing argument in behalf of the City, denying the points made by Mr. Davie and insisting that the Act while clear and specific, was fully constitutional. There was no doubt as to the right of the City to acquire the Water Works on the basis proposed and he contended that the franchise could not be claimed as a portion of its property, nor could the right of way for the mains be considered a right of eminent domain.

The case was submitted to the arbitrators at 10 o'clock to-night.

Ald. Carroll then asked to have the motion stand as a notice of motion.

Ald. Scoullar moved that a committee composed of one alderman from each ward be instituted to be called the Water Works Committee, and that it shall be their duty to take charge of the Water Works now to be acquired by the City.

The Mayor pointed out that such a committee was already in existence and the Clerk was asked to read their names.

Ald. Scoullar then pointed out that Ward 2 was not represented there.

The motion was then changed to have Ald. Scoullar appointed on the Committee in place of Ald. De Pencier, whose seat has been declared vacant.

CONSIDERATION OF BY-LAWS.

Moved by Ald. Brown, seconded by Ald. Templeton, that the By-Law to raise by loan the sum of \$440,000 for the purchase of the Water Works be read a third time and signed, sealed and gazetted. Carried.

This By-Law was then read a third time and passed.

Moved by Ald. Brown, seconded by Ald. Templeton, that the By-Law to raise by loan the sum of \$150,000 for the extension of the Water Works be read a third time and signed, sealed and gazetted. Carried.

This By-Law was also read a third time and passed.

The Council then adjourned.

VANCOUVER WATER WORKS.

The Arbitrators hand in their Award to the Council—Satisfactory to both Sides.

At Monday night's meeting of the City Council of Vancouver the following award of the arbitrators in the Water Works valuation case was read. The World says: So far as can be learned the city has no cause for dissatisfaction, while the Water Works Company has not in any way been robbed.

THE AWARD.

To all whom these presents shall come: We, John Milne Browning, Edward Gibson Tilton, and Montague W. Tyrwhitt Drake, send greeting.

Whereas by the Vancouver Water Works Act, 1886, and the Vancouver Water Works Act, 1891: The Corporation of the City of Vancouver, appointed John Milne Browning, an arbitrator for and on behalf of the said Corporation, and the Vancouver Water Works Company appointed Edward Gibson Tilton, an arbitrator for and on behalf of the said Company, and the Honorable Montague W. Tyrwhitt Drake, was appointed third arbitrator by the Honorable H. P. Fellow Crease, a Judge of the Supreme Court, to ascertain the value of the works and property of the said Vancouver Water Works Company and the expenses of operation and maintenance of said works and the gross income derived from the said works by the said Company up to the date of the arbitration. And whereas the time limited by the said Act for the said arbitrators making their award expired on about the 16th day of July, 1891, and on the 11th day of July, by an order of the said Supreme Court the time for making the said award was extended until the 30th day of August, 1891.

Now the said arbitrators having taken upon ourselves the burthen of this reference and having duly weighed and considered the several allegations of the said parties and also the proof, vouchers and documents which have been given in evidence before us, and having heard and examined the several witnesses upon oath of and concerning the matters so referred to us.

Do hereby make use and publish our award in writing of and concerning the matters so referred to us as aforesaid.

We award and adjudge that the value of the works and property of the Vancouver Water Works Company to be \$330,080.82. We further award and adjudge that the expenses of operation and maintenance of the said works from the time they came into operation, viz: On the 1st day of May, 1889, up till the 31st of July, 1891, amount to the sum of \$51,281.93. We further award and adjudge that the gross income derived from the said works by the said company up to the date hereof amounts to \$87,559.37.

In witness whereof we have hereunto set our hands and seals, this 1st day of August, 1891.

(Signed) J. M. BROWNING, [L. S.]
EDWARD G. TILTON, [L. S.]
M. W. TYRWHITT DRAKE, [L. S.]
Signed and published this 1st day of August, 1891, in the presence of
S. S. GERRARD,
Hotel Vancouver.

The following document was also read: Certificate in pursuance of agreement, 30th June, 1891:

August 1st, 1891. We certify that the following witnesses are entitled to be paid \$10 per day, and their reasonable travelling expenses for the time they were absent from their respective places of business or residence: James F. Gordon, Henry B. Smith, Col. J. W. Smith, P. Summerfield, H. B. Warren. We further certify that the following witnesses are entitled to be paid \$4 per day and their reasonable travelling expenses for the time they were absent from their respective homes: S. Thorsen, J. W. McFarland, E. T. Lowellyn, W. J. Bullin, M. F. Salisbury, G. A. Keefer.

We further certify that the following witnesses are entitled to be paid the amount set opposite their names, per day, and other reasonable travelling expenses: E. P. Ribbet, \$3; Sir Joseph Trutch, \$3; A. W. Cameron, \$2.50; J. H. Carlisle, \$2.50; E. E. Rand, \$2.
(Signed) M. W. TYRWHITT DRAKE,
EDWARD G. TILTON,
J. M. BROWNING.

TO-DAY'S VOTE.

To-day the municipal voters of Vancouver are asked to cast their ballots in respect to two By-Laws which have been placed before them by the City Council. One of these By-Laws is to authorise the Council to raise the sum of \$444,000 in order to purchase the property and franchise of the Vancouver Water Works Company. The other By-Law is to authorise the Council to issue a sum of \$150,000 "for the extension, improvement and perfecting of the said water works system. The general particulars of the water works system, the history of the Company which now owns it and the details of the manner in which the price that it is proposed the City should pay for the property was arrived at, are so well known that it is unnecessary now to refer to them at length. Indeed, to anyone who has carefully studied the whole question connected with the proposal to acquire the system for the City, it will appear superfluous even to urge upon the voters to cast a ballot in favor of both the By-Laws. To such persons, self-interest will be sufficient to secure their affirmative vote.

There are, however, some persons who appear to be in doubt as to the expediency of purchasing the works. To such we would say that if the By-Laws were carried a great blow will be struck at the City's prosperity. For many reasons it is desirable that the water works system should belong to the City. It means a large extension of the system at a much earlier date than will be the case if the Company should be allowed to retain possession of the property; the maintenance of higher rents for water and the retention by the Company of an annual surplus of revenue which otherwise would be available for the reduction of taxation or for the promotion of other municipal enterprises of general utility. If the taxpayers do not approve the By-Law to-day, they can do nothing more in the matter for a period of ten years, except with the consent of the Water Works Company. It is, therefore, the duty of every citizen who has a vote and desires that the residents in every portion of the City should enjoy the benefit of an ample supply of pure water at a moderate cost, to record his vote for the By-Law. Negligence or indifference to this duty may cost him dearly in the future.

We find that the chief objection to the purchase of the Water Works made by some persons, is the fear that the City Council may institute a costly system of management in order to provide comfortable berths for friends of the Aldermen. We are persuaded that this is a mistake, indeed, the whole record of the present Council is against the probability of such a thing. The people who have been its severest critics have been blaming the Aldermen for being too cautious, too economical in their methods, and the Chairman of the Finance Committee has been the butt of these would-be controllers of civic affairs. To say, therefore, that the purchase of the Water Works is likely to be seized upon by the Aldermen as an opportunity for the inauguration of extravagant methods and the creation of some highly salaried and unnecessary officials, is to suggest that the members of the Council intend to commit political suicide, and in the closing months of their administration to ignore the pledges which they gave at their elections. Let the taxpayers disregard such ideas and cast their ballots for the purchase and extension of the Water Works.

The immediate extension of the Water Works system, the promotion of sanitary improvements and decrease of disease and sickness; the early reduction of the rents for water to consumers and the promotion of industrial enterprises and the ultimate addition of a large sum to the civic revenues, will be the result of the acquisition of the Water Works by the City.

Shall the Vancouver Water Works Company or the taxpayers of Vancouver have the benefit during the next ten years of the \$500,000 or more of property that the sale of the supply of water will produce? That is the question to be decided at the polls to-day.

The voting on the By-Law to purchase the Water Works will be voted on to-day. A polling booth at the usual place has been opened for each Ward, namely: Ward One, No. 2 Fire Hall; Ward Two, R. A. Anderson's office; Ward Three, City Hall; Ward Four, Brunette St. Mill office; Ward Five, Temperance Hall. This by-law provides for the raising of the sum of \$400,000 for the purchase of the Works. Another by-law to provide for raising the sum of \$150,000 for the extension and improvement of the works will be voted on at the same time. The poll opens at 9 a. m. and remains open till 5 p. m. It is not expected that the vote will be numerous.

YESTERDAY'S VOTES.

The result of the voting yesterday on the two By-Laws—one authorising the purchase of the present system of water works at the price of \$440,000, and the other to authorise the expenditure of \$150,000 to improve and extend the system—was that they were carried with only an insignificant opposition to either of them. While this is satisfactory to the interests of the City, the smallness of the total vote polled yesterday cannot be so considered. If the opinion of those voters who abstained from casting their ballots, was proportionately represented by the votes actually recorded, as it is only reasonable to assume that it was, it would appear that the general idea was that the By-Laws were so certain to be carried, that many persons did not consider it necessary to exercise the privilege which, as taxpayers, they enjoy. But this is not as it should be. The best municipal government can only be obtained when the people concerned evince an intelligent and active interest in the matter. It is of little use to criticise the actions of the City Council, or of of any individual Aldermen, if, when some question of policy is referred to the constituency, the individuals composing it are too careless or indolent to give a tangible expression of their views. Doubtless such an incident as that shown by the light vote polled yesterday is really an expression of confidence in the Aldermen, but the indifference manifested is to be regretted.

WATER WORKS BY-LAW.

There was remarkably little apparent interest taken in the by-laws submitted to the vote of the people yesterday, though such important issues were involved. A very small proportion of the possible number of votes was polled. Two by-laws were before the people, one to raise \$440,000 for the purchase of the works and property of the Vancouver Water Works Company and the other to raise \$150,000 for the extension and improvement of the works. There were only two spoiled ballots in the total vote cast. The following is the result of the poll:

TO PURCHASE THE WATER WORKS.			
	For.	Against.	
Ward One.....	61	1	
Ward Two.....	42	4	
Ward Three.....	45	5	
Ward Four.....	38	2	
Ward Five.....	6	1	
Total.....	189	13	
Majority for the By-Law, 176.			
EXTENSION OF WATER WORKS.			
	For.	Against.	
Ward One.....	60	2	
Ward Two.....	39	2	
Ward Three.....	43	3	
Ward Four.....	39	2	
Ward Five.....	5	1	
Total.....	185	10	
Majority for the By-Law, 168.			







